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1902

TWENTY-SIXTH

ANNUAL REPORT

OF THE

BOARD OF TRUSTEES OF WATER WORKS

TO THE

CITY COUNCIL,

TOGETHER WITH THE

REPORTS OF THE OFFICERS OF THE BOARD,

For the Year 1881.

CLEVELAND, O.:
HOME COMPANION PUBLISHING CO
1882.

DUPLICATE EXCHANGE 3 AUG 1901
N. SOC. CIVIL ENGINEERS

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

REPORT OF

TRUSTEES OF WATER WORKS.

To the Honorable Mayor and Council of the City of Cleveland:

GENTLEMEN:—The addition to the pumping works by which the delivery capacity will be increased about 25 per cent. is so nearly completed that it can be used as occasion may require as will be seen by the report of the Superintendent and Engineer. The cost has been about $20,000 less than the estimate.

The quantity of distribution pipe laid the past year was unusually large, but not equal to the demand, a large number of petitions for pipe that it would have been desirable to lay had to be carried over to the present year, for the reason that they were presented too late in the season. The indications at the present time are that the quantity of pipe that will be required during the coming season will exceed that laid last year.

We would call your attention to the recommendation of the Superintendent and Engineer to lay large feeding mains in the different parts of the city named in his report. As stated by him the laying of such pipe has been neglected in the past on account of the small amount of funds at the disposal of the department and the desire on the part of the different Boards in the past to extend water privileges to new territory. We believe the laying of such mains cannot be longer delayed without doing injustice to water takers and working injury to this department.

The excessive cold of the winter months of the beginning of the year followed by the long drouth in summer operated to increase the daily average supply of water throughout the year to an extent that would have been alarming to cities less fortunately situated. As will be seen in the accompanying report the increase in the consumption of water over the preceding year was over 30 per cent.

During the summer months we found it necessary for the protection of such persons as depend upon a maximum and uniform pressure of water in their business to prohibit the use of hand hose during business hours, and shall hereafter continue to enforce the rule restricting the use of water for sprinkling yards, lawns or streets, and washing windows or pavements with hand hose to two hours in the morning and two hours in the evening.

We shall continue to apply meters in the future as we have done in the past, believing that method of preventing the wasteful use of water to be the only one offering any remedy for the great evil so prevalent in all American cities. We cannot believe that any such quantity of water as was pumped last year could be used for any useful purpose. It will be seen by the following tables that the average use for the year amounted to 76¾ gallons daily for each person in the city and to 162 gallons daily for each consumer.

The plan for supplying water to the elevated sections of the city laying to the south and east and and at the same time improving the present low service system having been brought to your notice and having received your cordial support the only question remaining to be decided is the location of the reservoirs. When these locations shall have been definitely determined upon it is our desire that the work may be prosecuted to completion as fast as may be consistent with economy and the best interests of the city. To this end we ask that there may be no unnecessary delay in furnishing the funds required to carry out the work as contemplated, that our fellow-citizens in all parts of the city may enjoy the benefits attending a bounteous supply of pure water.

All of which is respectfully submitted.

TRUMAN DUNHAM, S. W. SESSIONS, WM. H. LUTTON.	*Trustees of Water Works.*

CLEVELAND, March 28, 1882.

SECRETARY'S REPORT.

To the Board of Trustees of Water Works:

GENTLEMEN:—I hereby respectfully submit my report as Secretary for the year 1881.

Receipts for water including permits, less amount refunded, is - - -	$236,221 87
The net amount of expenses and repairs is -	65,016 26
Leaving the net earnings - - -	$171,205 61

The comparative amounts with the previous year are:

Increase of receipts for water - -	$33,843 95
Increase of expenses and repairs - -	9,101 37
Increase of net earnings - - -	$24,742 58

The increase of expenses and repairs is distributed among the accounts as follows:

Increase of office and general expenses -	$ 310 65
Increase of expenses at engine house - -	8,500 78
Increase of repairs - - -	289 94
	$9,101 37

The receipts and disbursements of cash for the year, including balances, as shown by the books of this office are as follows:

RECEIPTS.

For water from assessments	$136,270 09	
For water by meter measure	95,855 66	
For permits (in water rent account)	4,614 00	$236,739 75
On construction account	509 00	
On pipe extension account	2,821 40	
On water meter account	94 00	
On office and general expense account	863 34	
On general repairs account	286 93	4,574 67
Cash in office at last report	802 69	
Cash in City Treasury at last report	39,745 67	40,548 36
		$281,862 78

DISBURSEMENTS.

For pipe extension	$79,244 08	
For payments on new engine and boilers	43,167 94	
For payments on new boiler house	23,079 22	
For aqueduct extension and pump wells	9,545 25	$155,036 49
For office and general expenses	21,684 57	
For general repairs	8,308 32	
For expenses at engine house	35,608 96	
For repairs at engine house	564 68	66,166 53
For returned water rent		517 88
For water meters		5,343 33
Cash in office January 1, 1882	1,541 81	
Cash in City Treasury subject to draft January 1, 1882	53,256 74	54,798 55
		$281,862 78

The items of receipts other than those embraced in water rent account included in the foregoing statement of receipts are :

Jan	Valley railway, for laying water pipe	$	345 40
	Smith & Connor, for making connection		6 00
	Standard Oil Co., " "		36 62
	E. C. Griffith, for rent of rooms		38 00
Feb	Lake Shore Foundry, for scrap iron		686 34
	" " " for rejected pipe		452 63
	Cleveland & Pittsburgh R'y Co., for repairing pipe		6 75
	" " " for repairing hydrant		4 00
	" " " for repairing pipe		5 28
	" " " " "		3 50
March	Cleveland Rolling Mill Co. for repairing pipe		5 00
	W. O. Donnell, for three old boilers		500 00
	F. & H. Born, for making connection		18 82
	E. C. Griffith, for rent of rooms		25 00
	W. R. Anderson, for old cement pipe		3 00
April	H. J. Ready, for making connection		62 50
	" " "		127 15
	" " "		98 53
	" " "		77 17
	W. G. Boyer, " "		116 63
	Wilcox, Treadway & Co., for moving hydrant		17 30
May	E. C. Griffith, for rent of rooms		40 00
	C. & P. Railroad Co., for making connection		137 41
June	J. Cawthra, for old cement pipe		6 00
	C. C. Dewstoe, for making connection		7 88
	E. C. Griffith, for rent of rooms		37 00
July	Scofield, Shurmer & Teagle, for making connection		64 74
	W. G. Boyer, for making connection		72 73
	First Baptist Church, for making connection		17 95
August	C. C. C. & I. Railroad, for repairing leak		4 25
Sept.	V. C. Taylor, for rent of rooms		83 34
	W. E. Preston, for water meter		42 00
	E. I. Baldwin, for making connection		93 34
	Smith & Connors for water meter		52 00

Sept.	Strong, Cobb & Co., for repairing leak	6 23
	Cleveland Malleable Iron Co., for making connection	47 93
Oct.	V. C. Taylor, for rent of rooms	100 00
	Cleveland Transportation Co., for rent of dock	40 00
	Cleveland Rolling Mill Co., for rent of dock	500 00
	A. H. Heflebower, for 220 lbs. scrap iron	3 04
Nov.	J. Krause & Co., for making connection	94 23
Dec.	H. J. Ready, for making connection	96 71
	Republic Refining Co., for making connection	39 00
	Geo. Kelley, for making connection	14 17
	Scofield, Shurmer, & Teagle, for making connection	8 18
	Woods, Perry & Co., for making connection	28 72
	Smith & Connors, for making connection	53 25
	" " " "	61 16
	Lowering services for the year	187 00
		$ 4,574 67

LEDGER BALANCES JANUARY 1, 1882.

Face of Ledger.	Debit.	Credit.
Construction	$2,792,534 92	
Interest	121,984 59	
Water Meters	20,161 51	
City Treasurer	53,256 74	
Cash	1,541 81	
Water rent income		$1,216,408 31
Bonds redeemed		925,000 00
Bonds outstanding		800,000 00
City of Cleveland		48,071 26
	2,989,479 57	2,989 479 57

STATEMENT OF ACCOUNT WITH CITY TREASURER.

DEPOSITS.

January	10	$ 500 23	May	4	3,054 97	June	8	754 44
"	14	138 00	"	5	1,616 91	"	9	1,573 50
"	24	158 03	"	6	1,466 55	"	10	665 24
February	8	2,060 52	"	7	474 83	"	13	528 77
"	17	390 11	"	9	3,098 73	"	14	1,368 72
March	9	919 55	"	10	6,118 53	"	15	418 01
"	28	207 97	"	11	1,458 56	"	16	349 08
April	8	2,432 66	"	12	2,046 99	"	18	378 56
"	9	637 82	"	13	1,766 87	"	20	349 57
"	11	515 00	"	14	1,618 45	"	21	380 96
"	12	809 69	"	16	2,269 02	"	22	172 23
"	13	521 87	"	17	2,376 75	"	23	249 84
"	14	861 86	"	19	1,890 68	"	24	845 04
"	14	2,349 00	"	19	2,770 05	"	25	202 01
"	15	1,212 13	"	20	1,883 70	"	28	463 97
"	16	1,198 01	"	21	2,592 67	"	30	145 14
"	18	1,841 48	"	21	528 45	July	1	119 44
"	19	1,192 32	"	23	1,903 86	"	2	738 42
"	21	1,135 95	"	24	1,568 00	"	9	296 50
"	21	1,954 25	"	25	1,074 93	"	11	1,184 47
"	22	1,292 70	"	26	1,252 17	"	14	221 85
"	23	1,085 67	"	27	802 49	"	21	371 09
"	25	1,587 31	"	28	1,565 87	"	22	154 72
"	26	2,362 55	"	31	1,099 70	August	5	3,061 04
"	27	1,806 08	June	1	1,028 73	"	10	1,070 94
"	28	4,443 18	"	2	2,201 70	"	12	302 00
"	29	2,122 22	"	3	1,415 57	"	15	433 00
"	30	4,301 94	"	4	510 03	"	20	238 34
May	2	4,847 32	"	6	507 98	"	31	479 50
"	3	3,083 85	"	7	628 48	Septem'r	9	1,061 00

DEPOSITS—Continued.

Septem'r	13	244 00	October	27	1,933 71	Novem'r	22	1,188 12
"	21	405 24	"	28	2,143 95	"	25	792 15
"	22	580 93	"	29	6,324 36	"	26	642 81
October	3	892 50	"	31	6,393 81	"	28	1,015 84
"	4	530 23	Novem'r	1	5,609 17	"	29	2,408 21
"	5	467 02	"	2	5,196 68	"	30	1,142 48
"	8	2,115 87	"	3	4,595 02	Decem'r	1	2,255 10
"	10	635 18	"	4	3,520 74	"	5	4,701 45
"	11	703 75	"	5	3,177 23	"	7	904 84
"	12	448 77	"	7	1,628 57	"	9	1,127 32
"	13	1,835 11	"	8	1,113 24	"	9	488 45
"	14	724 08	"	9	885 39	"	10	687 20
"	15	501 38	"	10	9,013 79	"	12	644 17
"	16	3,994 83	"	11	2,633 38	"	14	870 62
"	18	1,219 22	"	12	1,741 25	"	16	482 22
"	19	2,001 53	"	14	8,693 61	"	17	1,218 41
"	20	1,147 71	"	15	2,335 76	"	20	212 00
"	21	1,486 74	"	16	1,429 23	"	21	360 66
October	22	1,437 83	"	17	1,866 94	"	24	338 12
"	24	1,759 26	"	18	1,767 81	"	31	442 93
"	25	2,619 18	"	18	678 48	"	31	1,927 18
"	26	1,467 02	"	21	1,290 52	Total Deposits		$240,057 42
Cash in City Treasury January 1, 1881								39,745 67
								$279,803 09

ORDERS DRAWN ON CITY TREASURY FOR MONTHLY DISBURSEMENTS.

1881.		
January	$ 8,045 42	
February	6,327 95	
March	16,380 41	
April	9,483 97	
May	19,298 23	
June	30,917 33	
July	21,955 52	
August	23,825 03	
September	22,769 18	
October	26,813 56	
November	27,822 70	
December	12,906 96	
Total amount of orders		$226,546 35
Balance in City Treasury subject to draft January 1, 1882		53,256 74
		$279,803 09

For a detailed statement of disbursements, reference may be had to the report of the Superintendent and Engineer.

BONDS.

One hundred thousand dollars of water bonds due January, 1881, were paid from the Sinking Fund for that purpose. Three hundred thousand dollars of water bonds held by the Sinking Fund Commissioners due in 1881 have been cancelled and filed with the City Auditor, leaving now outstanding eight hundred thousand dollars for the payment of which no special provision has been made.

Yearly receipts for water and the expenditures for running expenses and repairs from the introduction of lake water into the city until the present time. Also the earnings after deducting such expenditures.

Years.	Receipts for water.	Running expenses.	Repairs.	Receipts less running expenses and repairs.
1856 to 1859	$34,528 73	$29,845 49	$ 2,996 08	$ 1,687 16
1860	16,793 60	7,683 80	1,734 38	7,375 42
1861	17,097 85	7,768 36	1,350 84	7,978 65
1862	22,730 53	8,086 19	1,291 29	13,353 00
1863	23,421 30	10,011 96	835 54	12,573 85
1864	33,389 49	13.573 26	1,953 00	17,862 74
1865	40,888 01	17,346 56	1,382 21	22,159 24
1866	45,363 70	14,277 13	8,818 77	22,267 80
1867	51,862 45	14,246 06	3,685 79	33,930 60
1868	57,297 98	17,304 32	3,653 43	36,340 23
1869	62,869 72	18,880 13	3,299 56	40,690 03
1870	70,411 18	19,725 24	9,823 99	40,861 95
1871	80,487 44	24,382 16	10,155 33	45,949 95
1872	90,243 96	26,951 65	6,953 49	56,338 82
1873	108,431 00	38,216 30	3,673 07	66,539 63
1874	116,433 08	48,951 79	9,515 99	57,965 30
1875*	114,602 18	57,830 17	11,566 26	45,205 70
1876	140,935 87	51,481 59	15,966 86	73,487 42
1877	152,794 68	50,571 46	20,673 36	81,549 86
1878	160,125 70	47,183 44	22,453 91	90,488 35
1879	182,173 33	44,616 59	11,182 61	126,374 13
1880	202.377 92	47,618 76	8,296 13	146,463 03
1881	236,221 87	56,430 19	8,586,07	171,205 61

* for ten months.

By reference to the foregoing table it will be seen that the annual increase of receipts for the year exceeds any previous one. This increase is especially satisfactory as it has been obtained after a material reduction in the charge for water for street sprinkling. I anticipate that there will be also a large increase of receipts for water in the year 1882 while the expenses may but little exceed that of the year 1881.

Respectfully submitted,

H. C. HAWKINS,

Secretary.

Cleveland, March 28, 1882.

REPORT OF THE

SUPERINTENDENT AND ENGINEER.

To the Board of Trustees of Water Works:

GENTLEMEN:—I herewith submit the twenty-sixth annual report upon the condition of the Water Works.

LAKE CRIB.

No perceptible change has taken place in this structure since my last report. The experience with ice last winter has made it necessary, to insure an uninterrupted supply of water, that the keeper should remain at his post throughout the year. The rooms occupied by him have, therefore, been floored and sealed to make them suitable for winter occupation. No other repairs have been necessary. No steps have been taken yet to rebuild the superstructure, but the work cannot be delayed much longer with safety. I would recommend that during the coming summer the necessary action be taken to provide for its thorough repair.

TUNNEL.

Twice during the year the water from the river has reached the crib and mingled with the supply drawn to the pumps, both times during freshets in the river. The first time in March, when the ice in the river broke up and run out while the lake was still covered with solid ice. On this occasion the water was contaminated for three days. The second period of contamination was in December, and was of longer duration than the first, lasting about five days. It occurred, as in March, during a heavy freshet in the river accompanied by a continuous easterly wind that diverted the natural current of the lake and carried it to the westward. With these exceptions the water has been pure as could be desired.

BUILDINGS.

The south building has not required any repairs during the year. The tin roof of the Cornish engine house and the covering of the stand pipe tower have been painted and the gutters on the engine house and boiler houses have been thoroughly repaired and cemented where necessary. These buildings are all in good repair externally. The stairs leading to the top of the stand pipe are still in the condition I reported them last year. The contemplated change in that building made it advisable to defer immediate action.

The new boiler house, chimney and work shop have been completed in a substantial and satisfactory manner. The room now occupied by the new Worthington engine, formerly the east boiler room for the Cornish engines, has been fitted up and painted in a tasty manner and connected with the Cornish engine room by an arched opening twelve feet wide and twelve feet high. The floors are on the same level. By this arrangement the two Cornish engines and the new Worthington engines are practically in the same room, and when it becomes necessary to add another engine it can be placed in the West Cornish boiler room and the rooms connected in the same manner. These rooms are each twenty-eight feet by fifty feet in the clear and afford ample space for a ten million gallon pumping engine.

The dimensions of the new boiler house, inside, are as follows: Length 84 feet 6 inches, width 45 feet 4 inches, heighth to top of ventilators 40 feet 3 inches, heighth of chimney 136 feet, diameter of flue inside 6 feet; machine shop, length 52 feet 9 inches, width 17 feet 2 inches; blacksmith shop, length 26 feet 3 inches, width 18 feet 6 inches. The rooms with the basements under them afford conveniences for work and storage never before possessed by this department. The new boiler house contains six boilers, three of them of the marine type, 10 feet in diameter and 20 feet long. Two of them will run the new engine up to its full capacity, leaving one out of use at all times. The three others are of the Cornish type, each 6 feet in diameter and 30 feet long. Two of them will furnish steam for running either of the Cornish engines.

The manner of setting the marine boilers both in the new house and the south boiler house is novel and calculated to produce the best results from the fuel used, and is therefore, worthy of description. These boilers, like others of their type, have two flues extending from the back end of the fire-box to a combustion chamber near the rear end, which combustion chamber is also connected with the back ends of the small tubes leading thence to the tube heads near the front ends where the smoke and gases would, according to the usual plan of setting, be discharged into pipes leading to the chimney. Such boilers are usually encased in sheet iron, forming an air space around them or else covered with some non-conducting material to prevent radiation of heat.

Our marine boilers are set in separate chambers the sides and ends of which are formed of hollow walls of brick. The roof of the chambers is made by placing wrought iron I beams across the walls and covering them with cast iron plates. These plates are covered with non-conducting plaster.

The smoke and gases instead of being conducted to the chimney from the front end of the boilers in pipes are discharged into the chambers and envelope the boilers in their passage to the main flue at the rear. The openings from the chambers to the main flue are at the bottom and are provided with the usual damper grates for regulating the draft. A space of two feet is left around each boiler, excepting at the front end, which sets even with the front face of the wall. Iron doors through the front wall gives access to the chambers.

The advantages obtained by this method of setting are: First, the short time required to cool off the boilers to give access to the chambers for repairs or cleaning; second, the ready access afforded to all parts of the shell for making repairs without removing covering or brickwork; third, the thorough protection against radiation of heat, and the retention of the hot gases near the top of the boiler until by cooling they fall and pass into the main flue near the floor line. No interruption of the draft is noticed, and contrary to expectation, but little soot forms on the shells or in the flues where proper bridge walls are used.

NEW AQUEDUCT AND PUMP WELLS.

As a part of the work of increasing the water supply it became necessary to build a branch aqueduct with suitable pump wells and gate-wells, and to connect it to the one leading to the pumps in the south building. It was believed that the old aqueduct would be found so nearly water tight that a junction could be made with it without encountering much difficulty from water excepting such as might naturally be expected in the quicksand soil in which the work was built, but, before the trench had been fully excavated down to the main aqueduct, the quantity of water that appeared dispelled any such hope, and it was found that the connection could not be made unless some plan could be devised for stopping the leaks without interfering with the supply of water to the pumps in the south building. The aqueduct is five feet in diameter and the bottom twelve feet below the water surface.

The gates in the main aqueduct were closed so as to pass only sufficient water to supply the daily requirements of the city, but it was found that the leaks were even then too strong to permit the building of masonry in the trench. A lining of heavy sail cloth, having a diameter a little greater than that of the aqueduct and 100 feet in length was then prepared and with the aid of a submarine diver placed in the aqueduct, its center being at the junction and the ends fastened to the inside in such a manner as to prevent water from flowing outside of the canvas. This device effectually stopped the leaks and enabled the workmen to connect the masonry and remove the old wall without difficulty. The canvas resisted the pressure of the water until it had served its purpose and was removed. A second pump well was built in connection with this work preparatory to placing another pumping engine in the west wing of the old building.

The new work of enlargement has cost to this date as follows: 30 inch pumping main 6,886 feet long, $66,420.81; new boiler house, chimney and workshops, $27,969.58; new ten million-gallon pumping engine and three marine boilers each 10 by 20 feet, including setting and fittings, steam and water pipes within engine room, and one feed pump, $50,787.17; aqueduct gate-wells and two pump wells, $9,545.52; making the total cost thus far, $154,723.08. The final payment on the engine, due when it is accepted, is $7,700. Bills outstanding and work remaining to be done to complete the improvement will not increase the total outlay to more than $180,000, including 1,300 feet of 30 inch pipe to be laid in Superior street from Water street to the square. It is very gratifying to be able to report that the total cost will be not less than $20,000 below my original estimate which was $200,000.

MACHINERY AND BOILERS.

For information concerning the condition of the different engines and boilers you are respectfully referred to the report of Mr. Doty, Chief Enginer of Pumping Works.

The new Worthington engines have been set in place and connected with the boilers, but are not yet completed, the cylinder covering and lagging being the only work unfinished. They have been run at different times, for the purpose of testing joints and adjusting valves and other parts, and give promise of being equal in all respects, and superior in some, to the one already in use.

RESERVOIR

The only work, other than the care bestowed by the keeper in cutting grass, cleaning walks and removing weeds from the inner slopes, necessary in the way of repairs during the year was the rebuilding of a portion of the fence on the Duane street front.

As it is proposed to abandon this property as soon as a new resevoir can be built, it is not advisable to do any more work than the proper care and protection of the property may require.

MAIN PIPES.

With the exception of the 24 inch main pipe running out Garden street, no pipe larger than 10 inches in diameter extends east to Willson avenue.

The 30 inch main extending from the pumping works to the intersection of Superior and Water streets should be continued to Willson avenue during the coming season, not only for the better supply of the eastern part of the city, but that the intervening district may not suffer during times of excessive use. I would also call your attention to the necessity of laying a 12 inch main through Forest street from the 24 inch pipe in Garden street, south to Broadway, a distance of 6,400 feet. This pipe would operate as a feeder for Scovill street, Woodland avenue, Croton street and Broadway.

Another section of the city, which from its rapid growth needs an immediate increase in its supply, is that lying south of Walworth Run, and west of the Cuyahoga river. There should be laid for the supply of this district, and for the general supply of the West Side, a 30 inch main running from the pumping works through Taylor street to Bridge street, and through Bridge street to Kentucky street. where it would be connected with the main of the same size laid in 1873, a distance of 5,750 feet. At the intersection of Taylor and Bridge streets the pipe should be reduced to 24 inches in diameter, and extend to Lorain street, a distance of 650 feet, where it would be connected with the 10 inch pipe in that street. From this point it should be reduced to 20 inches and extended south, a distance of about 4,000 feet to Clark avenue, here it would be connected with a 10 inch pipe and feed east and west, and as the demand increases could be extended south to the south limits of the city. The great demand for water in the different sections of the city, particularly in the newer districts, with the limited amount of money at the command of the department, for use in laying pipe, has made it necessary to confine the annual outlay for pipe to the sizes that were appropriate for the streets in which they were laid, to the neglect of such pipes as were necessary as feeders. The time has now arrived when it is due to consumers, and when it will be to the interests of this department to lay such feeding mains as may be necessary to maintain a uniform pressure of water in all the newer parts of the city.

DISTRIBUTING PIPES.

There was added to the pipe system during the year 11 miles 2,399 feet of pipe for street distribution, making the total quantity now in use 126 miles 2,873 feet. The length of main pipe is 10 miles 2,746 feet, making a total of all sizes of 137 miles 339 feet.

The number of new stop gates set since December 31st, 1880, is 244. The total number in use December 31st, 1881, was 2,449.

Of fire hydrants 126 have been added during the year, which with those previously set makes the total number 1,124. During the year 10 were changed from 3 inch to 4 inch, and 1 from 3 inch to 6 inch.

For information in detail regarding the work above described see accompanying tables.

SERVICE PIPES.

The number of new service pipes connected with the distributing mains since December 31st, 1880, is 1,536, which added to the connections previously made, makes the total number 13,100. Of these 1,614 are not in use, some of them are permanently abandoned, others are not extended beyond the stop cock, and 200 are turned off temporarily. The increase in the number in use over 1880 is 1,173. The number in use on the last day of the year was 11,486.

CONNECTIONS MADE IN 1881.

⅝ inch	- - - - - - -	1,457
¾ "	- - - - - - -	21
1 "	- - - - - - -	11
1¼ "	- - - - - - -	3
1½ "	- - - - - - -	6
2 "	- - - - - - -	15
3 "	- - - - - - -	6
4 "	- - - - - - -	14
Total in 1881	- - - -	1,536

TOTAL CONNECTIONS.

⅝ inch	- - - - - -	12,321
¾ "	- - - - - -	414
1 "	- - - - - -	122
1¼ "	- - - - - -	7
1½ "	- - - - - -	28
2 "	- - - - - -	99
2½ "	- - - - - -	2
3 "	- - - - - -	41
4 "	- - - - - -	65
6 "	- - - - - -	1
Total of all sizes,	- -	13,100

METERS.

The number of meters added during the year was 85, making the total number in use 487. The different sizes and number of each size is as follows:

KIND OF METER.	¾ in.	1 in.	1½ in.	2 in.	3 in	4 in.	Total.
Worthington Piston	163	145	56	59	26	7	456
Ball and Fitts Piston	10	6	1				17
Fitts Rotary	3	1		1	2		7
Crown Rotary	3	4					7
Total	179	156	57	60	28	7	487

ELEVATORS.

The number of elevators operated by water power in use at this time is 53, of this number 11 have been added during the year ending December 31st, 1881.

The quantity of water measured by meters and hydraulic elevators was 815,602,500 gallons, being an increase of 160,185,838 gallons over the year 1880. The quantity now measured exceeds the total quantity pumped in 1868 by nearly 50 million gallons.

DISTRIBUTION.

The number of gallons of water pumped in 1881 was 4,847,209,363, an increase over the year 1880 of 1,121,526,342 gallons. The quantity pumped per day was 13,280,025 gallons, an increase over the daily average of 1880 of 3,100,564 gallons, or 15,000 gallons per day more than the total daily supply for the year 1870. The rate of increase over the year 1880 was 30.1 per cent., and is the largest increase since the year 1860. The cost of pumping each million gallons of water 100 feet high was $4.69.

GENERAL.

From present indications the demand for pipe extension during the coming year will equal, if it does not greatly exceed that of last year. The number of new buildings being erected is greater than at any other time in the history of Cleveland this fact, with the general condemnation of the wells of the city by the Board of Health and physicians, as the cause of many of the diseases so prevalent last fall, will, doubtless, cause a greater demand for lake water than ever before. The petitions for pipe carried over from last year, would, if granted, require the labor of two gangs of pipe layers for half the season, and the number of new petitions now being presented promise to make the coming year an exceedingly active one in this department.

The Board of City Improvements has advertised for proposals for repaving a number of the older streets, in many of these it will be necessary to lower the water pipes, to render them secure against the action of frost during such winters as that of last year, in others it will be necessary to lay new pipes. The amount of money at your disposal for laying distributing pipe, and lowering pipe in streets to be improved, will be ample for the purpose if the quantity of pipe to be laid does not greatly exceed that laid last year.

Respectfully submitted,

JOHN WHITELAW,
Superintendent and Engineer.

CLEVELAND, O., February 16th, 1882.

REPORT OF THE

ENGINEER IN CHARGE

OF THE

PUMPING WORKS.

To the Board of Trustees of Water Works:

GENTLEMEN:—The unparalleled demand upon the Pumping Department of the Cleveland Water Works for the year just closed, renders it my duty to inform your Honorable Body that my former calculations in regard to the wants of this Department will fall far short of the actual demands as developed by the past dry season, remarkable growth and business prosperity of the city, and it is highly gratifying to those in immediate charge of the Works to know that you are actively engaged maturing plans for the extension of the Works on a scale commensurate with the prospective demands of the future.

After passing through the severe winter of 1880 and 1881 we felt a great relief in the prospect of having our new Worthington engine ready for service before the warm weather approached, but in this we were disappointed. However, very fortunately, our machinery proved equal to the demand, and at this time I am able to report that the Pumping Department has been able to meet all legitimate demands upon it during the year just closed, and nothing in the nature of an accident has occurred excepting the giving out of the old Cornish boilers in the east boiler room which were reported condemned in my report for 1880. Since that date they have only been used occasionally while cleaning the west battery, and January 12th commenced leaking so badly that they were abandoned, and were removed from the building February 24th to make room for the new Worthington Pumps.

CORNISH ENGINES.

The old Cornish engines are in good condition and ready for service, but on account of the improvements going on around that building they have done much less work than formerly, especially the east engine. Their shallow pump pits render them almost useless, at such times as they are most needed. They are only available when the consumption is very light.

HENDERSON ENGINES.

These engines have been called into regular service for the first time since the Worthington engine No. 1 was started. Owing to the largely increased consumption of water and the improvement going forward on the north side. Extensive repairs of a general character will be necessary the coming spring,, as we shall need every available pump to meet the demands upon us during the hot weather.

Only slight repairs have been necessary on these engines.

WORTHINGTON ENGINE, NO. 1.

By reference to schedule giving the record of work done by each engine it will be seen that these engines have been in almost constant use. No repairs have been necessary.

January 7th new main pump valves were put in. The valves removed have served four and one-half years, and it was thought best to replace them as a precautionary measure, with new valves. The old valves are comparatively good and are kept as a reserve.

No repairs will be necessary on these engines the coming year unless an accident should happen them.

WORTHINGTON ENGINE NO. 2.

These engines, contracted for in 1879, were started December 28, 1881. Much delay has been experienced in the erection of these engines the cause of which you are already familiar. I can only say of these engines that they are of the same capacity as the Worthington engines now in use at the Works. Some minor improvements have been introduced, however, suggested by me, which in point of convenience and durability will add very much to the value of the engines. (viz.) metallic packing in all stuffing boxes, metal gaskets in all steam joints, permanent fastening of suction valve seats in main pump, etc. I feel confident that these engines will meet all our expectations fully and sustain the enviable reputation No. 1 has earned.

BOILERS.

Nine boilers have been in use since my last report, six in the south building and three in the north.

The boiler capacity of the south building is not sufficient for the engines now in the building when running full capacity, rendering it impossible to keep them clean and otherwise cared for. I see no remedy for this, unless the Henderson engines be removed and another Worthington put in its place. By adopting this suggestion we should have ample boiler capacity with one boiler at our disposal. By reference to the schedule giving the respective duties of the engines it will be observed that there is a difference of about 33 per cent. in favor of the Worthington.

The boilers known as the New Cornish are located as follows: three in the west boiler house north side, and three have just been placed in the new boiler house. These boilers are in good order and have needed no repairs since they were rebuilt in 1876.

The four Marine or return flue boilers and two tubular boilers in the south building have been in constant use during the year and but little repairs have been necessary, they are in good order and will require but very little expense the coming year.

Three new boilers have been put in the East end of the new boiler house of the same general plan as those now in use in the south building, at this early date I am not prepared to say much about them, the first fire having been put in them December 15th. However, our experience with those in the south building has seemed to warrant their adoption.

RECOMMENDATIONS, ETC.

In view of the experiences of last year it would seem proper for me to suggest that immediate steps be taken to increase the capacity of the Water Works and Pumping facilities.

By reference to the tables giving the quantities of water pumped it will be seen that many times during the year we exceeded the capacity of the pumps in use, viz. the Henderson eight million gallons capacity, and the Worthington ten million gallons per twenty-four hours, and nothing to fall back upon but the old Cornish pumps, with a combined capacity of about seven and a half millions.

Since the No. 2 Worthing pumps have been put in it would seem that the circumstances were somewhat changed. It would appear to add about 33 per cent. to our capacity, but when we are brought face to face with the fact that the increased consumption for the year 1881 was 33 per cent. this delusion disappears at once.

I am aware that you are somewhat familiar with these significant facts, but I believe I should fail in doing my whole duty were I to close this report without calling your attention to the matter. With no storage it seems to me dangerous to depend upon this small reserve.

I would therefore recommend that you provide two ten million gallon pumps at your earliest convenience, one to take the place of the Henderson engines, and the other for the west wing of the north building. Also furnish three boilers of equal capacity as those just put in, and complete the other half of the present new boiler house, as contemplated in the drawings and plans now on file in the Water Works Office.

It has been our custom to do most all the repairs of machinery at the Works with our regular force, and no separate account has been kept of this work, for this cause the running expenses would seem to have been increased. This is not the fact, however, as our force remains about the same numerically as last year, and all the legitimate increase is due to a slight advance in wages made by the Board last June.

The expense for repairs outside of our regular force has been so small that I refrain from making any report of it.

Schedule showing gallons of water pumped and coal consumed in pumping. Per centage of coal consumed and water pumped by each engine, contract price of coal, coal consumed and cost of raising 1,000,000 gallons into reservoir:

Engines	Gallons of water pumped by different engines.	Pounds of coal consumed by different engines.	Per cent. of water pumped by the different engines.	Per cent. of coal consumed by the different engines.	Pounds of coal consumed pumping 1,000,000 gallons water into reservoir.	Contract price of coal per ton.	Cost of raising 1,000,000 gallons into reservoir.	Year
No. 1 Worthington	2,630,411,400	7,273,710	54 25	44 21	2,776	$1 55	$2 15	1881
No. 2 "	23,565,340	77,300	50	48	3,270	1 55	2 53	"
Henderson	1,810,672,008	7,769,240	37 48	47 22	4,290	1 55	3 32	"
Cornish	375,642,225	1,332,100	7 77	8 09	3,540	1 55	2 74	"

IMPROVEMENTS, ETC.

The N. Y. P. & O. R. R. track has been extended into the Water Works yard north of the new boiler house with express reference to our convenience in handling coal. The coal for the new house is shoveled directly from the cars into the fire room, thereby saving much labor in handling fuel.

With our narrow gauge railroad track again in order for taking coal to the south boiler house, we shall be able to dispense with hauling by team as we have been obliged to do the past year.

The transformation of the east boiler room into an engine room has been accomplished with good effect, making it the pleasantest engine room around the Works, it is light and attractive, and when the No. 2 Worthington engine is lagged and painted the engine and surroundings will be in perfect harmony and a credit to the works.

Our work shops have not been supplied with tools, and, of course, are of very little value to us as yet, but we hope to have this done the coming summer. There is a growing necessity for this improvement, and with your co operation we shall soon expect to enjoy its advantages.

The following tables will show in a comprehensive form the work done by the different engines during the year 1881, and enable you to compare the work of this year with former years.

Respectfully submitted,

R. DOTY,

Engineer in Charge.

TABULAR STATEMENTS.

The following pages contain tabular statements showing the work of engines, distribution of water, extension and laying of pipes, location and number of stop gates and hydrants set, abstract of expenditures, &c.

CORNISH ENGINE RECORD FOR 1881.

WEST ENGINE.

MONTHS	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in Feet and Decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total			
January	15	325	35	171,815	10,000	174,600	184,600	55,152,615	159 500	39,851,902
February	16	346	5	177,300	11,400	201,800	213,200	56,032,500	159 307	35,576,438
March	29	558	40	290,225	11,000	304,300	315,300	93,162,225	158 744	30,212,083
April	28	257	55	130,825	30,000	131,800	162,400	43,020,825	158.128	35,764,091
May	24	283	15	145,775	26,000	144,800	170,800	46,783,775	158 156	36,236,024
June	22	251	55	133,975	28,000	131,000	150 000	43,005,075	157 754	35,083,381
July	7	98	45	57,075	11,400	53,000	64,400	18,321,075	157 900	37,590,090
August	2	10		4,700	13,000	5,000	18,000	1,508,700	158.874	11,135,968
September	8	92	....	32,475	12,000	52,400	64,400	16,844,475	158 791	34,578,453
Totals and Averages	149	2,222	10	1,170,225	158,400	1,198,700	1,352,100	375,642,225	158 583	33,958,782

CORNISH ENGINE RECORD FOR 1881—*Continued.*

EAST ENGINE.

MONTHS.	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in Feet and Decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January....................	7	97	35	52.300	15.000	57.800	72,800	16,788,300	159.666	30,792.272
Totals and Averages..	7	97	35	52,300	15,000	57.800	72.800	16.788,300	159.666	30,792.272

CORNISH ENGINE RECORD FOR 1881—*Concluded.*

BOTH ENGINES

Engines	Days.	Pumping			Coal Consumed			Gallons of Water Pumped.	Height in Feet and Decimals.	Duty.
		Hrs.	Min	Strokes.	Raising Steam.	Pumping.	Total.			
West Engine	149	2.222	10	1.170.225	153.400	1.198,700	1,352,100	375,642.225	158.583	33,958,782
East Engine.	7	97	35	52.300	15.000	57,800	72,800	16.788.300	159.698	30,792.272
Totals and Averages	156	2.319	45	1.222,525	168.400	1,256.500	1.424.900	392.430.525	158.691	33,642.131

HENDERSON DUPLEX ENGINE, RECORD FOR 1881.

MONTHS.	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in Feet and Decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	18	405	30	307,232	3,000	757,500	760,500	166,530,008	159.653	29,366,329
February	16	345	......	266,153	4,400	685,100	689,500	147,601,992	159.890	28,752,821
May	20	679	10	517,826	4,600	1,071,200	1,075,800	278,851,833	158.149	34,434,018
June	13	278	40	201,752	1,000	369,000	370,000	108,348,645	157.878	35,495,226
July	26	538	15	329,379	....	611,300	611,300	176,217,765	158.400	38,355,670
August	31	744	......	457,541	1,440	959,100	960,540	244,784,435	159.048	34,048,182
September	24	538	45	289,373	3,000	663,400	666,400	154,814,555	158.358	29,432,021
October	31	744	......	371,036	1,200	923,700	924,900	198,504,260	158.559	27,224,250
November	30	703	15	323,295	1,200	882,800	884,000	172,962,825	163.000	26,789,954
December	28	660	.....	302,908	1,200	825,100	826,300	162,155,780	158.027	26,033,787
Totals and Averages	246	5,636	35	3,366,495	21,040	7,748,200	7,769,240	1,810,772,008	159.096	30,993,225

WORTHINGTON DUPLEX ENGINE No 1, RECORD FOR 1881.

MONTHS	Days	PUMPING			COAL CONSUMED			Gallons of Water Pumped.	Height in Feet and Decimals.	Duty
		Hrs	Min	Strokes	Raising Steam	Pumping	Total			
January	26	603	30	307,076	1,200	770,300	771,500	227,587,120	159 567	39,374,250
February	28	647	55	307,850	......	784,200	784,200	246,667,000	159.505	41,991,468
March	31	744	......	499,932		886,600	886,600	309,957,840	158 723	46,416.517
April	30	720	....	481,937	4,200	812,400	816,600	298,800 940	158 088	48,315,777
May	8	102	50	97,427	5,000	194,200	199,200	60,404,740	158.104	40,103,484
June	25	534	33	396,001	....	579,200	579,200	208,320,620	157.592	47,412,782
July	31	724	30	424,773	13,400	729,200	742,600	263,359,280	158.349	46,974,973
August	31	738	45	394,442	960	649,400	650,360	244,554,040	159.113	49,744,782
September	30	717	30	375,957	2,000	670,400	672,400	233,093,340	158 900	43,281,305
October	31	735	30	271,515	800	591,950	592,750	168,339,300	158 566	37,671,961
November	30	714	45	293,847	800	588,600	589,400	182,185,140	163.000	42,145,188
December	31	741	30	285,713	800	588,100	588,900	177,142,080	159.040	39,765,342
Totals and Averages	332	7,785	18	4,228,470	29,160	7,814,550	7,878,710	2,620,411,400	158 909	43,599,819

WORTHINGTON DUPLEX ENGINE No. 2, RECORD FOR 1881.

MONTHS.	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in Feet and Decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
December............ ...	4	80	.. ...	38,057	5,000	72,300	77,300	23,595,340	158 750	....
Totals and Averages..	4	80	..	38,057	5,000	72,300	77,300	23,595,340	158 750	....

SCHEDULE

SHOWING THE DISTRIBUTION OF WATER FOR EACH MONTH AND DAY IN THE YEAR [illegible]

MONTHS	Gall's Water Pumped by Cornish Engines	Gall's Water Pumped by Henderson Engines	No. 1 Gall's Water Pumped by Worthington Engines.	No. 2 Gall's Water Pumped by Worthington Engines	GALLONS DISTRIBUTED Per Month.	GALLONS DISTRIBUTED Average per Day.	GALLONS DISTRIBUTED Each inhabitant per day.	GALLONS DISTRIBUTED Each consum'r per day.
January	71,940,915	166,539,998	227,587,130	....	466,068,043	15,034,130	86 90	183.78
February	53,932,560	151,201,992	246,067,000	....	451,201,552	16,114,341	93 14	196 09
March	94,162,225	....	308,957,840	....	403,120,065	13,004,873	75 16	158 98
April	43,920,825	....	298,800,940	....	342,721,765	11,424,059	66 03	139 65
May	46,793,775	278,851,833	60,404,740	....	386,050,348	12,453,237	71 98	152 23
June	43,035,975	108,318,645	208,320,620	....	359,675,240	11,989,175	69 30	146 56
July	18,321,075	156,217,765	283,359,260	....	457,898,100	14,770,906	85 38	180 58
August	1,568,700	244,724,435	244,554,040	....	490,847,175	15,833,780	91 52	193 56
September	16,844,475	151,814,555	233,093,340	....	401,752,370	13,391,746	77 98	161.93
October	....	198,504,260	168,339,330	....	366,843,590	11,833,663	68 40	144.66
November	....	172,962,825	182,185,140	....	355,147,965	11,838,265	68 42	144.71
December	....	162,155,780	177,142,000	23,595,340	362,893,120	11,706,231	67 67	143 10
Totals and Averages ...	392,430,525	1,810,772,098	2,620,411,400	23,595,340	4,847,209,363	13,280,025	76.70	162 34

SCHEDULE

SHOWING THE TOTAL AND AVERAGE QUANTITIES OF WATER PUMPED EACH YEAR SINCE THE BEGINNING OF THE WORKS.

YEARS.	GALLONS DISTRIBUTED.				Per cent of Increase.
	Per Year.	Per Day.	Each inhabitant per day.	Each consumer per day.	
1857	127,202,265	348,664	7.75	110.68	
1858	142,155,434	398,467	8.37	93.44	11.70
1859	198,284,090	513,107	11.31	91.27	39.45
1860	260,220,354	710,984	14.11	101.57	31.87
1861	322,175,022	881,599	16.32	114.50	23.81
1862	369,673,092	1,012,794	19.47	120.57	14.74
1863	420,790,875	1,152,875	20.97	117.54	12.83
1864	476,114,225	1,300,858	21.68	123.89	12.14
1865	517,261,005	1,417,153	21.80	122.70	8.64
1866	587,372,220	1,609,239	22.35	124.26	13.55
1867	696,369,375	1,907,861	23.85	115.98	18.55
1868	768,786,975	2,106,265	24.77	116.08	10.40
1869	898,936,425	2,462,839	27.36	120.20	16.92
1870	1,126,228,500	3,085,558	30.86	113.20	25.28
1871	1,367,021,100	3,746,907	35.68	124.90	21.43
1872	1,686,370,895	4,607,571	40.07	131.64	22.67
1873	1,869,768,835	5,095,230	43.06	137.71	10.85
1874	2,050,252,910	5,625,150	45.36	141.10	9.65
1875	2,216,775,816	6,073,358	44.00	136.65	8.12
1876	2,309,225,403	6,573,220	49.22	131.28	8.23
1877	2,820,326,074	7,726,920	55.91	142.24	17.55
1878	2,892,946,823	7,925,882	51.13	135.05	2.57
1879	3,455,271,981	9,466,498	62.69	145.61	19.43
1880	3,725,683,021	10,179,461	65.25	145.23	7.82
1881	4,847,209,363	13,280,025	76.76	162.34	30.1

SCHEDULE SHOWING THE EXTENSION OF PIPE IN 1881.

Side	Size	Street.	Between what points.	Feet Laid	Total	Remarks
	30	Engine house grounds	From a point 65 ft W. of E. L. of W. W. Property on N. L. of Division st., northwesterly to Old Works to connect with Worthington engine.	72	72	
North	12	Franklin ave	W. L. of Waverly st., west	8	8	
West	10	Lincoln ave.	From 5 ft south of Euclid ave., south	5	5	
East	8	Bank st	T in St. Clair to cross in Lake.	700		
North	8	Broadway	Hyd. at Petrie to 108 ft. E. of Hamlet	2723		
East	8	Custead ave	28 ft north of Euclid, north	8		
West	8	Doan st.	S. L. Euclid to 13 ft S. of N. L. Cedar	1550		
South	8	East Prospect st	E. L. Willson ave. to 248 ft. E. of Schieley court	1206		
East	8	Ellsworth	T in Woodland to cross in Lundy	1142		
South	8	Garden.	T. in Lodge to T in First ave	382		
East	8	McBride.	Cross in Willson to T in Broadway	997		
West	8	Merwin	163 ft. S. of James st. south	81		Relaid 8 & 8.
South	8	Orange.	Cross in Mayflower to 187 ft. E. of Humboldt.	878		
East	8	Oakland	N. L. Detroit to 182 ft. N. Crescent.	1993		

SCHEDULE SHOWING THE EXTENSION OF PIPE IN 1881—*Continued.*

Side.	Size.	Street.	Between what points.	Feet Laid.	Total.	Remarks.
North.....	8	Payne ave.........	Cross in Belden to T in Willard............	441		
East.......	8	Seneca.......	N. L. Superior, north............................	241		
North.. ..	8	Woodland ave.	T in Madison to T in Ellsworth............	2065		
East.......	8	Willson ave.............	S. L. Bower to Cross in McBride......	2989	17,395	
East.......	6	Arlington....	T in Scovill north to connect pipe.....	516		
South......	6	Auburn.........	Cross in Scranton to E. L. Merchant.........	1715		
East.......	6	Belden.....	Cross in Superior to S. L. Payne ave.................	1628		
West.......	6	Birch.........	N. L. Lorain st., north...............	6		
East......	6	Blair......................	T in Cedar to Hyd. at Garden.................	800		
East. . .	6	Brock.....	T in Lorain to 167 ft. S. of Bradford Ext.	735		
South.. ..	6	Buckeye	T in Case avenue to T in Wallingford court..	566		
North......	6	Carroll.........	E. L. Fulton to cross in York.................	1460		
East......	6	Carter.	Hyd. at Hotchkiss & Gaylords, north to connect pipe.	596		
East.......	6	Case ave.......	N. L. St. Clair to cross in Hamilton........	360		
South......	6	Circle..........................	Pipe in York to T in Fulton.....	108		
East. :..	6	Cheshire.........	T in Garden to S. L. Prospect..........................	967		Relaid C. 4 & 6.

SCHEDULE SHOWING THE EXTENSION OF PIPE IN 1881—*Continued.*

Side	Size	Street.	Between what points	Feet Laid.	Total.	Remarks.
East	6	Chester	S. L. Woodland to N. L. Beaver	743		
East	6	Clifton	Cross in Superior to 257 ft. S. of St. Clair	745		
South	6	Cypress	T in Willson to Hyd. at Dike	1646		
East	6	Dike	T in Quincy, south	38		
East	6	Douglass	Pipe in Payne ave., south	6		
East	6	Duane	T in Woodbine, north	30		
East	6	Everett	Pipe in Payne ave., south	6		
South	6	Fifth ave	T in Willson to E. L. Willson	56		
East	6	First ave	Cross in Quincy to T in Garden	1008		
East	6	Florence	Cross in Cypress to 195 ft. N. of Scovill	904		
South	6	Fourth	T in Willson to E. L. Willson	56		
West	6	Granger	T in Garden to S. L. Prospect	1058		Relaid C. 4 & 6.
East	6	Green	S. L. Lorain to T in Monroe	1276		
East	6	Green	T in Lorain to S. L. Lorain	40		Relaid I. 4 & 6.
East	6	Greenwood	Cross in Cedar to N. L. Garden	634		
East	6	Greenwood	S. L. Garden to 8 ft. N. of Marion	877		

SCHEDULE SHOWING THE EXTENSION OF PIPE IN 1881—*Continued.*

Side.	Size.	Street.	Between what points.	Feet Laid.	Total.	Remarks.
North	6	Harlem	T in Willson to 13 ft W. of Willson	56		
South	6	Hamilton	T in Wason to cross in Case	777		
East	6	Hamlet	T. in Broadway, north	1267		
West	6	Hicks	T in Bridge to T in Moore	397		
West	6	Humboldt	T in Orange to 10 ft. N. of Croton	556		
East	6	Hunter	T in Broadway, north	35		
East	6	Jersey	T in Monroe to S. L. Lorain	1195		
East	6	Jersey	S. L. Lorain to 8 ft. north of Lorain	75		Relaid I. 4 & 6.
South	6	John	T in Harbor to T in Woodbine	967		
East	6	Kentucky	T in Terrett to S. L. Franklin	144		
East	6	Laurel	N. L. Woodland to S. L. Scovill	1025		
East	6	Lodge ave	Cross in Quincy to T in Garden	1022		
West	6	Lorain	W. L. Smith to 13 ft. N. of Bradford	504		
East	6	Lyman	S. L. St. Clair to cross in Superior	1073		
East	6	Lyman	T in St. Clair to S. L. St. Clair	42		Relaid I. 4 & 6.
East	6	Lyman	271 N. of Mason north to connect pipe	267		

SCHEDULE SHOWING THE EXTENSION OF PIPE IN 1881—*Continued.*

Side	Size	Street.	Between what points	Feet Laid	Total	Remarks.
South.. ..	6	Mahoning	E. L. Literary east to Connotton R. R.	777		
South.. ..	6	Mahoning	T in Literary to E. L. Literary	20		Relaid I. 4 & 6
East ..	6	Maple	N. L. Woodland to cross in Scovill	1081		
West	6	Merchant ave.	Cross in Starkweather to cross in Auburn	496		
North.. ..	6	Monroe	T in Green to T in Penn	357		
West	6	Monumental Park	102 feet south of Superior, south	33		
West	6	Morse ave	S. L. Euclid to 17.5 ft. S. of N. L. East Prospect	793		
East	6	Oliver	T in Oregon, North	12		
East	6	Osborn	S. L. Garden, South	15		
East	6	Pier	S. L. Woodland to N. L. Beaver	743		
North.. ..	6	Scovill ave..	W. L. Slater to cross in Florence	367		
East ..	6	Schieley court	T in East Prospect, north	553		
East	6	Second ave	Pipe in Cedar to S. L. Cedar	24		
South.. ..	6	Seymour ave	W. L. Columbus to T in Hitchcock	1207		
East	6	Sheriff	T in Prospect to 7 ft. N. of Prospect	37		Re'aid I. 4 & 6
West	6	Spangler ave	N. L. Euclid, north	625		

SCHEDULE SHOWING THE EXTENSION OF PIPE IN 1881—*Continued.*

Side.	Size.	Street.	Between what points.	Feet Laid.	Total.	Remarks.
West	6	Smith	T. in Lorain, south	442		
East	6	Sterling ave	Cross in St. Clair to cross in Hamilton	415		Relaid C. 4 & 6.
South	6	Stone	Cross in Oakland, east	457		
South	6	Terrett	T in Harbor to T in Kentucky	815		
South	6	Third ave	T in Willson to E. L. Willson	56		
South	6	Wade ave	W. L. Pearl to cross in Hitchcock	1253		
East	6	Wallingford court	T in Buckeye, north to connect pipe	406		
South	6	Warren	T in Solon to 36 feet east of W. L. Martin	1239		
South	6	White ave	Hyd. at Baker street to 14 feet east of W. L. Norwood	652		
South	6	Windsor ave	E. L. Case to pipe in Willson	1750		
East	6	York	N. L. Vestry to S. L. of Circle	290		
	6	Hydrant connections		32	42,389	
South	4	Beck	T in Case ave., east	381		
East	4	Greenwood	Cross in Cedar to T in Sibley	343		
West	4	Hicks	T in Moore, south	114		
West	4	Lee's court	T in Woodland ave., north	400		

SCHEDUDE SHOWING THE EXTENSION OF PIPE IN 1881—*Continued.*

Side	Size.	Street	Between what points	Feet Laid	Total	Remarks.
South.	4	McKinstry	T in Literary, west	503		
East	4	McLean	N. L. Lorain, north	8		
South.	4	Vestry	Pearl to York	531		Relaid Cement
		Hydrants and cistern con		1300	3,640	Total 4.
North	3	Baldwin court	Pipe in alley, east	71		
West	3	Alley E. of Ontario and N of St Clair	T in St Clair, north, to elbow in Baldwin court	181	252	Total 3.
					63,761	Total Pipe.

SCHEDULE OF PIPE TAKEN UP AND RELAID IN 1881.

Diameter of Pipe Taken up.	Diameter of Pipe Relaid.	Street.	Between What Points.	Feet.	Total.	Remarks.
8	8	Merwin	163 ft. S. of James st. south	81		Iron.
4	6	Cheshire	T in Garden to S. L. Prospect	967		Cement.
4	6	Granger	T in Garden to S. L. Prospect	1,058		"
4	6	Green	T in Lorain to S. L. Lorain	40		Iron.
4	6	Jersey	S. L. Lorain to 8 ft. N. of Lorain	75		"
4	6	Lyman	T in St. Clair to S. L. St. Clair	42		"
4	6	Mahoning	T in Literary to E. L. Literary	20		"
4	6	Sheriff	T in Prospect to 7 ft. N. of Prospect	37		"
4	6	Sterling	Cross in St. Clair to Cross in Hamilton	415		Cement.
4	4	Vestry	Pearl to York	531	3,266	"

TOTAL FEET OF PIPE LAID TO DECEMBER 31, 1881.

Diameter of Pipe in Inches	36	30	24	20	16	12	10	8	6	4	3
Laid previous to 1881....	2,000	19,965	9,980	10,974	12,555	8,490	68,078	99,980	283,231	133,231	14,754
Laid in 1881		72	....	....	....	8	5	17,305	42,389	3,640	252
Total	2,000	20,037	9,980	10,974	12,555	8,498	68,083	117,285	325,620	136,871	15,006
Taken up in 1881 ...		......	....	......	......	....	....	81	....	3,185	....
Total in use ..	2,000	20,037	9,980	10,974	12,555	8,498	68,083	117,204	325,620	133,686	15,006
	55,546					668,097					

RECAPITULATION.

55,546 ft. of Supply Main....	equal to	10	miles	2,746	feet.
668,097 ft. of Distributing Main.	"	126	"	2,817	"
723,643 ft. of Pipe..............	"	137	"	283	"

SCHEDULE

SHOWING THE SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1881.

NO.	SIZE.	STREETS.	SIDE.	LINE OF STREET.	REMARKS.
1	30 in.	Engine house grounds		Check valve	
1	8 "	Bank st	East.	N. L. St Clair st	
1	8 "	" "	"	S. L. Lake st	
1	8 "	Broadway	North.	E. L Hollister st	
1	8 "	"	"	E L. McBride st.	
1	8 "	"	"	E. L. Barkwill st	
1	8 "	"	"	E. L. Hamlet st	
1	8 "	Doan st	West	736 feet S. of Euclid ave.	
1	8 "	" "	"	N. L. Cedar ave	
1	8 "	East Prospect st	South.	E. L. Schieley Court	
1	8 "	Ellsworth st	East.	S L. Woodland ave	
1	8 "	" "	"	N. L. Lundy st	
1	8 "	Garden st	South.	W. L Lodge ave	
1	8 "	McBride st	"	W. L. Willson ave.	
1	8 "	" "	"	N. L. Broadway	
1	8 "	Oakland st	East.	N. L. Herrmann st	
1	8 "	" "	"	N. L. Cass st	
1	8 "	Orange st	South.	E. L. Mayflower st	
1	8 "	" "	"	E. L. Humboldt st.	
1	8 "	Payne ave	North.	E. L. Belden st	
1	8 "	Woodland ave	South.	E. L Madison ave., fr S.	
1	8 "	" "	North.	W. L. Lincoln ave	
1	8 "	" "	"	W. L. Lisbon st	
1	8 "	Willson ave	East.	92 ft. S of Maurice st	
1	8 "	" "	"	941 ft. N of McBride st.	

SCHEDULE

SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1881—Continued.

No.	SIZE.	STREET.	SIDE.	LINE OF STREET.	REMARKS.
1	8 in.	Willson ave	East	N. L. McBride.	
1	8 "	Seneca street	"	S. L. Frankfort	
2.	8 in.	Total 8 inch valves			
1	6 "	Arlington st	East	N. L. Scovill ave	
1	6 "	Auburn st	South.	E. L. Scranton ave	
1	6 "	"	"	W. L. Jennings ave... .	
1	6 "	"	"	E. L. Jennings ave	
1	6 "	"	"	W. L. Merchant ave .	
1	6 "	Belden	East	S. L. Superior.	
1	6 "	"	"	N. L. Payne ave	
1	6 "	"	"	S. L. " "	
1	6 "	Blair ..	"	S. L. Cedar "	
1	6 "	Brock	North.	E. L. Lorain	
1	6 "	Buckeye ..	South.	E. L. Case ave .	
1	6 "	Carroll	North	E. L. Penn	
1	6 "	"	"	E. L. Jersey	
1	6 "	"	"	W. L. York	
1	6 "	Carter	East	N. L. Collins	
1	6 "	Cheshire	"	N. L. Garden	C. from 4 to 6.
1	6 "	" . . .	"	S. L. Prospect	C. from 4 to 6.
1	6 "	Chester. ...	"	S. L. Woodland ave	
1	6 "	Clifton .. .	"	N. L. Superior .	
1	6 "	Cypress	South.	E. L. Willson ave....	
1	6 "	"	"	W. L. First ave. ..	
1	6 "	"	"	W. L. Florence.	
1	6 "	"	"	E. L. " .	
1	6 "	Dike . ..	East	S. L. Quincy .	
1	6 "	Duane. .. .	"	N. L. Woodbine	

SCHEDULE

SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1881—Continued.

NO.	SIZE.	STREET	SIDE.	LINE OF STREET.	REMARKS.
1	6 in.	Fifth ave	South.	E. L. Willson ave	
1	6 "	First "	East.	N. L. Quincy	
1	6 "	" "	"	S. L. Garden	
1	6 "	Florence	"	N. L. Scovill ave	
1	6 "	"	"	S. L. " "	
1	6 "	Fourth ave	South.	E. L. Willson "	
1	6 "	Granger	West.	N. L. Garden	C. from 4 to 6.
1	6 "	"	"	S. L. Prospect	C. from 4 to 6.
1	6 "	Green	East.	N. L. Monroe	
1	6 "	"	"	S. L. Chatham	
1	6 "	"	"	S. L. Lorain	C. from 4 to 6.
1	6 "	Greenwood	"	S. L. Garden	
1	6 "	"	"	S. L. Cedar ave	
1	6 "	Harlem	North.	W. L. Willson ave	
1	6 "	Hamilton	South.	W. L. Case "	
1	6 "	"	"	E. L. Wason	
1	6 "	Hamlet	East.	N. L. Broadway	
1	6 "	Hicks	West.	S. L. Bridge	
1	6 "	Humboldt	"	S. L. Orange	
1	6 "	Hunter	East.	N. L. Broadway	
1	6 "	Jersey	"	S. L. Lorain	C. from 4 to 6.
1	6 "	"	"	N. L. "	C. from to 6.
1	6 "	"	"	N. L. Chatham	
1	6 "	"	"	S. L. "	
1	6 "	"	"	N. L. Monroe	
1	6 "	John	South.	E. L. Harbor	
1	6 "	"	"	S. L. Woodbine	
1	6 "	Kentucky	East.	S. L. Franklin	
1	6 "	Laurel	"	S. L. Scovill ave	
1	6 "	"	"	N. L. Woodland ave	C. from 4 to 6.

SCHEDULE

SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1881—Continued.

NO.	SIZE.	STREET	SIDE.	LINE OF STREET.	REMARKS.
1	6 in	Lodge ave	East	N. L. Quincy	
1	6 "	" "	"	S. L. Garden	
1	6 "	Lorain	"	S. L. Brock	
1	6 "	Lyman	"	S. L. St. Clair	C from 4 to 6
1	6 "	"	"	N. L. Superior	
1	6 "	Mahoning	South.	E. L. Literary	C from 4 to 6
1	6 "	"	"	W. L. Dry Dock	
1	6 "	Maple	East	S. L. Scovill ave	
1	6 "	"	"	N. L. Woodland ave	C from 4 to 6.
1	6 "	Merchant ave	West	N. L. Auburn	
1	6 "	Morse ave	"	N. L. East Prospect	
1	6 "	Osborne	East	S. L. Garden	
1	6 "	Pier	"	S. L. Woodland ave	
1	6 "	Schieley Court	"	N. L. East Prospect	
1	6 "	Second ave	"	S. L. Cedar ave	
1	6 "	Seymour ave	South.	W. L. Pearl	
1	6 "	" "	"	E. L. Mill	
1	6 "	" "	"	E. L. Hitchcock	
1	6 "	Sheriff	East	N. L. Prospect	C. from 4 to 6
1	6 "	Smith	West	S. L. Lorain	
1	6 "	Sterling ave	East	N. L. St. Clair	C from 4 to 6
1	6 "	Stone	South.	E. L. Oakland	
1	6 "	Terrett	"	E. L. Harbor	
1	6 "	"	"	W. L. Kentucky	
1	6 "	Third ave	"	E. L. Willson ave	
1	6 "	Wade ave	"	W. L. Pearl	
1	6 "	" "	"	E. L. Mill	
1	6 "	" "	"	E. L. Hitchcock	
1	6 "	Wallingford Court	East	N. L. Buckeye	
1	6 "	Warren	South.	S. L. Warren	

SCHEDULE

SHOWING SIZE, NUMBER AND LOCATION, OF STOP GATES SET IN 1881—Concluded.

NO.	SIZE.	STREET.	SIDE.	LINE OF STREET.	REMARKS.
1	6 in.	Warren	South.	W. L. Dille....	
1	6 "	White ave.	"	W. L. Norwood..........	
1	6 "	Windsor ave...	"	809 feet E. of Case ave...	
1	6 "	" "	"	W. L. Willson ave.	
1	6 "	Woodland ave	"	W. L. Lee's Court.. ...	
1	6 "	York	East.	S. L. Circle.....	
5	6 "	For hydrants.			
96	6 in.	Total 6 in. set in 1881.			
1	4 "	Beck	South.	E. L. Case ave....... ...	
1	4 "	Greenwood.	East.	N. L. Cedar ave. ...	
1	4 "	"	"	S. L. Sibley.....	
1	4 "	Lee's Court...........	West.	N. L. Woodland ave. ...	
1	4 "	McKinstry Court.....	"	N. L. Literary....... .. .	
1	4 "	McLean........... ...	East.	N. L. Lorain........	
136	1½ "	For hydrant and cistern connections...			
142	4 in.	Total 4 in valves set in 1881.			
1	3 "	Alley east of Ontario & north of St. Clair.	West.	N. L. St. Clair st..... ..	

RECAPITULATION OF STOP GATES FOR 1881.

Water way—in inches	36	30	24	20	16	12	10	8	6	4	3	Total
Set previous to 1881	1	22	7	17	20	18	90	175	604	995	256	2,205
Set in 1881	1	1	....	..	....	...		26	96	142	1	266
Total	1	23	7	17	20	18	90	201	700	1137	257	2,471
Taken out in 1881	...	...	....		...		....	1	...	13	8	22
Total	...	23	7	17	20	18	90	200	700	1124	249	2,449

SCHEDULE

SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1881—Concluded.

NO.	SIZE.	STREET.	SIDE.	LINE OF STREET.	REMARKS.
1	6 in.	Warren	South.	W. L. Dille............	
1	6 "	White ave...........	"	W L Norwood..........	
1	6 "	Windsor ave.........	"	899 feet E. of Case ave...	
1	6 "	" "	"	W. L. Willson ave.	
1	6 "	Woodland ave	"	W. L. Lee's Court..	
1	6 "	York	East.	S. L. Circle........	
5	6 "	For hydrants.			
96	6 in.	Total 6 in. set in 1881.			
1	4 "	Beck	South.	E. L. Case ave	
1	4 "	Greenwood.	East.	N. L. Cedar ave	
1	4 "	"	"	S. L. Sibley.....	
1	4 "	Lee's Court...........	West.	N. L. Woodland ave....	
1	4 "	McKinstry Court.....	"	N. L. Literary.......	
1	4 "	McLean.......... ...	East.	N. L. Lorain.............	
136	4 "	For hydrant and cistern connections...			
142	4 in.	Total 4 in valves set in 1881			
1	3 "	Alley east of Ontario & north of St. Clair.	West.	N. L. St. Clair st	

RECAPITULATION OF STOP GATES FOR 1881.

Water way—in inches	36	30	24	20	16	12	10	8	6	4	3	Total
Set previous to 1881	1	22	7	17	20	18	90	175	604	995	256	2,205
Set in 1881	1	1	....	....	....	...	..	26	96	142	1	266
Total	1	23	7	17	20	18	90	201	700	1137	257	2,471
Taken out in 1881	....	...	....		...		....	1	...	13	8	22
Total	....	23	7	17	20	18	90	200	700	1124	249	2,449

SCHEDULE

SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1881.

No.	Size.	Streets.	Feet	Location.	Side.
1	4 in.	Auburn	459	E. of Scranton ave	South.
1	4 "	"	248	E. of Jennings ave	"
1	4 "	"	209	W. of Merchant ave	"
1	4 "	"	......	On E. L. of Merchant ave.	"
1	6 "	Bank	36	S. of Johnson st	East.
1	4 "	Beck	381	E. of Case ave	North.
1	4 "	Belden ave	272	S of Superior st	East.
1	4 "	"	672	S. of Superior st	"
1	4 "	"	407	N. of Payne ave	"
1	4 "	"	16	N. of Payne ave	"
1	4 "	Blair	379	S. of Cedar ave	"
1	4 "	Broadway	95	W. of Holister st	North.
1	4 "	"	8	E. of Fowler ave	"
1	4 "	"	19	W. of McBride st	"
1	4 "	"	388	E. of McBride st	"
1	4 "	"	73	E. of Barkwill ave	"
1	4 "	"	17	E. of Hamlet st	"
1	4 "	"	24	S. of Irving st	East.
1	4 "	"	357	S. of Irving st	"
1	4 "	Brock	167	S. of Bradford Extension	"
1	4 "	Buckeye	178	E. of Case ave	South.
1	4 "	"	6	W. of Wallingford court	"
1	4 "	Carroll	....	At Penn st	North.
1	4 "	"	146	W. of Jersey st	"
1	4 "	"	225	E. of Jersey st	"

SCHEDULE

SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1881—CONTINUED.

No	Size.	Streets.	Feet	Location.	Side.
1	6 in	Carter	7	N. of Collins st	East.
1	4 "	Case ave	..	At Hamilton st	"
C 1	3-4 "	Cheshire	...	At Garden st	"
1	4 "	"	311	N. of Garden st	"
1	4 "	Chester	278	S. of Woodland ave	"
1	4 "	"		At N. L. of Beaver st	"
1	4 "	Clifton	13	N. of Superior st	"
1	4 "	"	484	N. of Superior st	"
1	4 "	Cypress	123	W. of First ave	South.
1	4 "	"	10	W. of Slater st	"
1	4 "	"		At Dike st	"
1	4 "	Doan	321	S. of Euclid ave	West
1	4 "	"	395	N. of Wilbur st	"
1	4 "	"	...	At Cedar ave	"
1	4 "	East Prospect	340	E. of Willson ave	South.
1	4 "	"	152	W. of Schieley court	"
1	4 "	"	248	E. of Schieley court	"
1	4 "	Ellsworth		At Woodland ave	East.
1	4 "	"	504	S. of Woodland ave	"
1	6 "	"	.	At Lundy st	"
1	3-4 "	Euclid ave	61	E. of Muirson st	North.
C 1	3-4 "	"	70	E. of Dodge st	"
C 1	3-4 "	"	375	E. of Huntington st	South.
C 1	3-4 "	"	114	W. of Perry st	North.
1	4 "	Fifth ave	7	W. of Second ave	South.
1	4 "	"	400	E. of Willson ave	"
1	4 "	First ave	215	N. of Quincy st	East
1	4 "	"	386	S. of Garden	"
1	4 "	"	9	S. of Garden	"
1	4 "	Florence	167	S. of Scovill ave	"
1	4 "	"	..	At Cypress st	"

SCHEDULE

SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1881—CONTINUED.

No.	Size.	Streets.	Feet.	Location.	Side.
1	4 "	Fourth ave	594	W. of Second ave	South.
1	4 "	Granger	289	N. of Garden st	West.
C 1	3-4 "	"	368	S. of Prospect st	"
1	4 "	Green	342	S. of Lorain st	East.
1	4 "	"	73	S of Chatham st	"
1	4 "	"	6	N. of Monroe st	"
1	4 "	Greenwood	9	S. of Pine st	"
1	4 "	Hamilton	331	W. of Case ave	South.
1	4 "	Hamlet	423	N. of Broadway	East.
1	4 "	"	849	N. of Broadway	"
1	4 "	"	1238	N. of Broadway	"
DV 1	4 "	Hicks	5	N. of Moore st	"
1	4 "	Humboldt	125	N. of Orange st	West.
1	4 "	Jersey	236	S. of Lorain st	East.
1	4 "	"	242	S. of Chatham st	"
1	4 "	John	213	E of Randall st	South.
1	4 "	Laurel	264	S. of Scovill ave	East.
1	4 "	"	345	N. of Woodland ave.	"
1	4 "	Lee's court	343	N. of Woodland ave	West.
C 1	3-4 "	Literary	......	First Hyd. S. of N.Y.P.& O.R.R.	East.
1	4 "	Lodge ave	243	N. of Quincy st	"
1	4 "	"	358	S. of Garden st	"
1	4 "	"	3	S. of Garden st	"
1	4 "	Lorain	......	At Smith st	West.
1	4 "	"	13	N. of Bradford st	"
1	4 "	Lyman	268	S. of St. Clair st	East.
1	4 "	"	348	N. of Superior st	"
1	4 "	McBride	......	At Hector st	"
1	4 "	McKinstry	470	N. of Literary st	West.
1	4 "	"	153	N. of Literary st	"
1	4 "	Mahoning	13	W. of Dry Dock st	South.

SCHEDULE

SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1881—CONTINUED.

No	SIZE	STREETS	FEET	LOCATION.	SIDE.
1	4 in	Maple	300	S. of Scovill ave	East
1	4 "	"	200	N. of Woodland ave	"
1	4 "	Morse ave	345	S. of Euclid ave	West.
1	4 "	"		At East Prospect st	"
1	4 "	Oakland	200	N. of Detroit st	East.
1	4 "	"	8	S. of Herrmann st	"
1	4 "	"	73	N. of Cass st	"
1	4 "	"	132	N. of Crescent st	West.
1	4 "	Orange		At Grove st	South.
1	4 "	"	187	E. of Humboldt st	"
1	4 "	Pier	313	S. of Woodland ave	East.
1	4 "	"		On N. L. of Beaver st	"
1	3-4 "	Prospect	258	W. of Erie st	North.
1	3-4 "	"	283	E. of Sheriff st	South.
1	3-6 "	Sheriff		At Prospect st	West.
1	4 "	Schieley court	97	N. of East Prospect st	East
1	4 "	"	488	N. of East Prospect st	West.
1	6 "	South Water	123	S. of James st	East
1	4 "	Seymour ave	27	E. of Mill st	South.
1	4 "	"	280	W. of Mill st.	"
1	4 "	Spangler ave	282	N. of Euclid ave	West
1	4 "	"	623	N. of Euclid ave	"
1	4 "	Smith	307	S. of Lorain st	"
1	3-4 "	Sterling ave		At St. Clair st	East
1	4 "	Stone	419	E. of Oakland st	South
1	6 "	Terrett		At Kentucky st	"
1	4 "	"	319	E. of Harbor st	"
1	4 "	Vestry	91	W. of Pearl st	"
1	4 "	Wade ave	50	W. of Pearl st	"
1	4 "	"		At Mill st	"
1	4 "	"	288	E. of Hitchcock st	"

SCHEDULE

SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1881—CONCLUDED.

No.	Size.	Streets.	Feet	Location.	Side.
1	4 in.	Warren	389	W. of Dille st......................	South.
1	4 "	"	8	W. of Dille st....	"
1	4 "	"	... ..	At Martin st................ . .	"
1	4 "	White ave.........	.....	At Addison st........	"
1	4 "	"	......	At Norwood st..................	"
1	4 "	Willson ave..........	16	N. of Francis st..................	East.
1	4 "	"	90	S. of Maurice st................	"
1	4 "	"	504	S of Maurice st.................	"
1	4 "	"	943	N of McBride st....	"
1	4 "	"	509	N. of McBride st	"
1	4 "	"	36	N. of McBride st................	"
1	4 "	Windsor ave	450	E. of Case ave..................	South
1	4 "	"	897	E. of Case ave................	"
1	4 "	"	298	W. of Willson ave........	"
1	4 "	Woodland ave.....	198	W. of Edwards ave..............	North.
1	4 "	"	149	E. of Edwards ave....	"
1	4 "	"	83	W. of Southern ave......... ...	"
1	4 "	"	......	At Congress st..................	"
1	4 "	York	10	S. of Circle	East.
137	Total.				

SCHEDULE

SHOWING THE LOCATION OF FIRE HYDRANTS CHANGED IN 1881

No	Taken up	Set.	Streets.	Feet	Location.	Side.
1	3 in	4 in.	Cheshire	.....	At Garden st	East
1	3 "	4 "	Euclid ave	61	E of Muirson st	North.
1	3 "	4 "	"	70	E of Dodge st	"
1	3 "	4 "	"	375	E of Huntington st......	South.
1	3 "	4 "	"	114	W. of Perry st.........	North.
1	3 "	4 "	Granger	368	S. of Prospect st.............	West.
1	3 "	4 "	Literary..	.....	1st Hyd. S. of N.Y.P.& O.R.R	East.
1	3 "	4 "	Prospect.........	258	W. of Erie st	North
1	3 "	4 "	"	263	E of Sheriff st...............	South.
1	3 "	6 "	Sheriff	....	At Prospect st...	West.
1	3 "	4 "	Sterling ave... ...	....	At St. Clair st	East.
11	Total Hydrants changed					

HYDRANTS MOVED IN 1881.

No.	Size.	Streets	Location	Side.
1	4 in.	Cheshire ...	From 410 feet S. of Prospect st. to 207 feet S. of Prospect st	East.
1	4 "	Greenwood .	From about 20 feet N. of Garden st. to 40 feet S of Garden st	"
1	4 "	Mason	Moved 12 feet W. from 251 feet E. of Lyman street	South.

RECAPITULATION OF HYDRANTS FOR 1881.

	In.	No.
Hydrants set in 1881	4	132
Hydrants set in 1881	6	5
Total Hydrants set in 1881		137
Hydrants in use December 31st, 1880		998
Total		1,135
Hydrants changed in 1881		11
Total Hydrants in use December 31st, 1881		1,124

CISTERNS CONNECTED IN 1881.

No.	SIZE.	STREETS.	SIDE.	LOCATION.
1	4 in.	Brock	East.	277 ft. N. of Bradford extension and 19 ft. W. of E. L. Brock street.
1	4 "	Doan	West.	20 ft. S. of N. L. of Wilbur st. and 20 ft. W. of E. L. Doan street.
1	4 "	Oakland	East.	20 S. of Stone st. and 33 ft. E. of W. L. Oakland street.
4	4	Total Cisterns Connected.		

RECAPITULATION.

Pipe Extension	$ 79.244 08
General Repairs	8,308 32
Office and General Expenses	21,684 57
Engine House Expenses	35,608 96
Engine House Repairs	564 68
Aqueduct Connection	9.545 25
Water Meters	5 343 33
New Boiler House	23,079 28
New Engine and Boiler	43,167 94
Total	$226,546 35

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TWENTY-SEVENTH

Annual Report

OF THE

BOARD

OF

rustees of Water Works,

OF THE

CITY OF CLEVELAND, O.,

FOR THE YEAR ENDING DECEMBER 31, 1882.

DUPLICATE EXCHANGE 2 AUG. 1901
SOC. CIVIL ENGINEERS

PRESENTED BY

TWENTY-SEVENTH

ANNUAL REPORT

OF THE

BOARD OF TRUSTEES OF WATER WORKS

TO THE

CITY COUNCIL,

TOGETHER WITH THE

REPORTS OF THE OFFICERS OF THE BOARD,

For the Year 1882.

CLEVELAND, O.
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TILDEN FOUNDATIONS.
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REPORT OF THE

TRUSTEES OF WATER WORKS.

To the Honorable City Council:

The Trustees of Water Works, in compliance with law, submit their report for the year 1882.

The receipts for water, as shown by the Secretary's report, gives a gratifying increase over the previous year, notwithstanding the reduction made by us in the rate for water furnished by measure. The work of the Department for the year consists mainly in the extension of the main and distributing pipe system, of which a large amount was done. Through the concurrent action of your body a portion of the land has been obtained, by purchase, for the site of the proposed lower level reservoir, and legal proceedings have been instituted to procure the remainder of the land for both high and low service reservoirs, as proposed. Therefore, relying upon your assistance in our efforts, we hope during the ensuing season to contract for all of the work contemplated in the enlargement and extension of the works, so as to supply water to the higher portions of the city, and also to construct as much of the same as may be deemed advisable, having in view both the character of the work and necessities of the public, to accomplish which we shall soon be compelled to ask for the issue and sale of the bonds of the city, as authorized by law, of such amount as the progress and the necessities of the work may require.

For a detailed condition of the works, we submit the accompanying reports of the Secretary and Superintendent and Engineer.

Respectfully submitted.

S. W. SESSIONS,
W. H. LUTTON,
WALTER BLYTHE,
Board of Trustees of Water Works.

Cleveland, O., March 6, 1883.

SECRETARY'S REPORT.

To the Board of Trustees of Water Works:

I hereby respectfully submit my report, as Secretary, for the year 1882.

The receipts for water, including permits, less amount refunded, is	$251,994 46
The net amount of expenses and repairs is	65,693 03
Leaving the net earnings	$186,301 43

The comparative amounts with the previous year, are

Increase of receipts for water,	$15,772 59
Increase of expenses and repairs,	676 77
Increase of net earnings,	$15,095 82

The receipts and disbursements of cash for the year, including balances as shown by the books of this office, are as follows:

RECEIPTS.

For water from assessments, less amount refunded	$146,284 38
For water by meter measure	101,348 08
For permits (in water rent account)	4,302 00
For water works bonds, sold par value	100,000 00
For premium on the same	62 50
On pipe extension account	5,334 56
On office and general expense account	690 00
On water meter account	237 00
On construction account, less amount refunded	185 95
On general expense account	65 09
On engine house expense account	27 00
Total receipts	$358,596 56
Cash in City Treasury at last report	53,256 74
Cash in office at last report	1,541 81
Total	$413,395 11

DISBURSEMENTS.

For pipe extension	$277,869 21
For final payment on pumping engine, etc	8,946 12
For payment on new boiler house	963 27
For payment on acqueduct work	32 18
On construction account	177 00
For lands, etc., Fairmount reservoir	31,935 50
On water meter account	11,229 48
For expenses at engine house	36,544 95
For office and general expenses	22,002 52
For general repairs	6,043 79
For repairs at engine house	1,883 86
Total disbursements from City Treasury	$397,127 88
Cash in City Treasury January 11, 1883	15,023 89
Cash in office January 11, 1883	1,243 34
Total	$413,395 11

The disbursements include payments of pay-rolls and all other claims of the month of December, allowed by the Board of Trustees at their meeting January 6, 1883; and the balances in the City Treasury is the amount subject to draft after such payment.

The items of receipts, other than those embraced in water rent account, included in the foregoing statement of receipts, are

Jan.	A. Bradley, for use of dock	$ 40 00
	L. & H. Senior, for pipe and labor	18 81
	Lamson, Sessions & Co., for pipe and labor	458 22
	A. C. Taylor, for rent of rooms	100 00
	Brush Electric Light Co., for changing location of water pipe.	78 75
	Worswick Manufacturing Co., repairing pipes	6 25
	H. J. Reidy, for making elevator connection	74 15
	O. Townsend, for making elevator connection	115 75
	O. Townsend, for elevator connection	113 15
Feb.	J. B. Perkins, connection	23 34
	H. Henschen, connection	48 72
	Eberhard Manufacturing Co., connection	37 67
	Union passenger depot, for water meter	32 50
	C. & P. Railroad, for water meter	42 50
March.	Connotton Valley Ry., connection	71 82
	T. W. Cornell, connection	71 61
	A. B. Halliwell, for 88 lbs scrap iron	88
	Lampson, Sessions, & Co., for connection	145 53
	John O'Donnell, for scrap iron	185 95
April.	C. & P. Railroad Co., for repairing leak	25 00
	A. C. Taylor, for rent of rooms	100 00
	Lake Shore Foundry, for 75,920 lbs scrap iron	607 36
May.	Cleveland City Forge, making connection	67 72
	L. S. & M. S. Ry., freight charges refunded	3 15
	Forest City House, for water meter	27 00
	Valley Railway Co., repairing pipes	15 80
	" " " " "	8 04
June.	Standard Oil Co., connection	62 10
	Mrs. George Buckham, for laying pipe	1,580 79

June.	Mrs. George Buckham, for laying pipe	590 97
	F. A. Wadsworth, for water meter	27 00
	C. H. Strong, for use of steam pump	50 00
	Standard Oil Co., 27 gallons valvoline	27 00
	F. A. Wadsworth, 1 valve box cover	88
July.	V. C. Taylor, rent of rooms	100 00
	S. V. Harkness, for two water meters	54 00
	Brush Electric Light Co., for connection	117 51
August.	Lamson, Sessions & Co., laying pipe	73 83
	J. B. Perkins, connection	63 10
	N. Y. C. & St. L. Ry Co., for making connection	67 23
	Adelbert College, for pipe connections	116 55
	Smith & Connor, for connection, Adelbert College	91 11
	L. S. & M. S. Ry Co., for moving fire hydrant	15 26
	N. W. Cutter, for elevator connection	75 44
	Connotton Valley Ry Co., for Connection	27 01
Sept.	C. C. Dewstoe, for connection	20 60
	" " " "	23 77
	W. Dehen, for money refunded	1 00
	N. Y. C. & St. L. Ry Co., for making connection	25 06
	Northern Ohio Woolen Mills, changing connection	34 19
Oct.	V. C. Taylor, for rent of rooms	100 00
	Grasselli Chemical Works, making connection	65 82
Nov.	John Whitelaw, for one horse sold by him	10 00
	F. A. Wadsworth, for connection	29 58
	H. N. Raymond, for water meter	27 00
	L. Schlather, for connection	59 32
	Robert Greenlagh, for connection	76 38
Dec.	H. Weitherhead, 4 pieces old cement pipe	1 50
	Warner & Swasey, for connection	68 19
	F. A. Wadsworth, for connection	22 81
	Smith & Connor, for connection,	11 45
	" " for 3 water meters	81 00
	V. C. Taylor, for rent of rooms	100 00
	City Treasurer, for damage collected of J. Marshall	100 00
	For lowering water pipes for the year	16 00
		$6,539 60

LEDGER BALANCES.

Face of Ledger.	Debit.	Credit.
Construction	$3,071,502 19	
Interest	121,922 09	
Fairmount reservoir (lands	31,985 50	
Water meters	28,068 39	
City Treasurer	15,023 80	
Cash	1,243 31	
Water rent		$1,399,594 31
Bonds outstanding		900,000 00
Bonds redeemed		925,000 00
City of Cleveland		48,071 29
	$3,272,665 60	$3,272,665 60

BONDS AND INTEREST.

One hundred thousand of Water Works bonds have been issued during the year, leaving outstanding nine hundred thousand dollars. The bonds so issued bearing interest semi-annually, at the rate of 3 65-100 per cent. per annum, were sold at a premium amounting to sixty-two dollars and fifty cents.

All of the interest ($54,000) accruing in 1882 on Water Works bonds has been paid from the general interest fund of the city, but the sum of twenty thousand dollars will be transferred from the Water Works Fund to such interest fund to reimburse the same for a portion of the interest so paid.

Yearly receipts for water and the expenditures for running expenses and repairs from the introduction of lake water into the city until the present time; also, the earnings after deducting such expenditures.

Years.	Receipts for Water.	Running Expenses.	Repairs.	Receipts less expenses and repairs.
1856 to 1859	$ 34,528 73	$ 29,845 49	$ 2,996 08	$ 1,687 16
1860	16,793 60	7,683 80	1,734 38	7,375 42
1861	17,097 85	7,768 36	1,350 84	7,978 65
1862	22,730 53	8,086 19	1,291 29	13,353 05
1863	23,421 30	10,011 96	835 54	12,573 80
1864	33,389 49	13,573 26	1,953 49	17,862 74
1865	40,888 01	17,346 56	1 382 21	22,159 24
1866	45,303 70	14,277 13	8,818 77	22,207 89
1867	51,862 45	14,246 06	3,685 79	33,930 60
1868	57,297 98	17,304 32	3,653 43	36,340 23
1869	62,869 72	18,880 13	3,299 56	40,690 03
1870	70,411 18	19,725 24	9,823 99	40,861 95
1871	80,487 44	24,382 16	10,155 33	45,949 95
1872	90,243 96	26,951 65	6,953 49	56,338 82
1873	108,431 00	38,218 30	3,673 07	66,539 63
1874	116,433 08	48,951 79	9,515 90	57,965 30
1875*	114,602 13	57,830 17	11,566 26	45,205 70
1876	140,935 87	51,481 59	15,966 86	73,487 42
1877	152,794 68	50,571 46	20,673 36	81,549 86
1878	160,125 70	47,183 44	22,453 91	90,488 35
1879	182,173 33	44,616 59	11,182 61	126,374 13
1880	202,377 92	47,618 76	8,206 13	146,463 03
1881	236,221 87	56,430 19	8,586 07	171,205 61
1882	251,994 46	57,857 47	7,835 56	186,301 43

* for ten months.

The earnings for the year was affected by a reduction made in the rate charged for water furnished by meter measure, such reduction taking effect at the semi-annual collection in October, and amounting in that collection to not less than eight thousand dollars.

Respectfully submitted,

H. C. HAWKINS, *Secretary.*

Cleveland, February 6, 1883.

REPORT OF THE

Superintendent and Engineer.

To the Board of Trustees of Water Works:

GENTLEMEN,—The twenty-seventh annual report of your Superintendent and engineer is herewith submitted.

LAKE CRIB.

This structure has passed through the storms of another year without apparent change or injury. The only work done upon it was the resetting of some of the inner braces, the painting of the rooms occupied by the keeper, and some slight repairs to the light tower. I would again call your attention to the necessity of taking some action, in the near future, looking to the rebuilding of the superstructure, as recommended in former reports.

TUNNEL.

This part of the works is believed to be in good condition, there has been no interruption to the flow of water from ice or other causes, since the brief stoppage by ice in December, 1880. The quality of water the supplied has been equal to that of former years, with the exception hereafter noted.

BUILDINGS.

No general repairs have been necessary on any of the buildings. Such work as has been necessary has been done by the regular employes of the Works.

ENLARGEMENT.

The work of enlargement, commenced in the spring of 1880, was completed early the past season. The cost of the different parts of the work was as follows:

Boiler house, work shop, chimney and foundations, - - - - - - -	$28,815 79
Ten million gallon engine and three boilers, -	59,850 35
Aqueduct and two pump wells, - -	9,577 43
Thirty-inch main pipe, 8,212 feet, - -	79,129 54
Total cost, . - - - - -	$177,373 11

The estimated cost was $200,000.

Of the thirty-inch main pipe laid in connection with this work, 1,326 feet, costing $12,708.73, was laid during the past season, and is included in the length of that size of pipe given under the head of main pipes. The cost of the two improvements are then as follows:

Enlargement as shown above, - - -	$177,373 11
Extension of main pipes, less that above noted,	131,565 21
Total cost of the two improvements, -	$308,938 32

The bonded debt of the city was increased only to the extent of $100,000 to carry out these improvements; the balance has been paid from the surplus income of the Department accruing during the three years of construction.

MACHINERY.

As will be seen by the report of Mr. Doty, engineer in charge of Pumping Works, all the different engines and boilers are in good repair. I heartily concur in his recommendation regarding alterations in the suction pipes of the Cornish engines, and would add that the work cannot be completed any too soon for the safety of the works.

RESERVOIR.

During the early part of the month of July, complaints were received at the office from water takers on the west side of the river, particularly from those in the immediate vicinity of the reservoir, that the water had an exceedingly disagreeable taste and odor of fish. Direct pumping was commenced on the 17th of the month, and the water drawn off from the reservoir, and the basins thoroughly cleaned by the 22nd. After direct pumping was commenced, no further complaints were heard, though the water for several days after was not entirely free from this taste and odor. Water taken from the shore of the lake at the same time, was found to be similarly affected, the trouble was thus traced to its source — Lake Erie.

Our water has been, heretofore, singularly exempt from such contamination, when we consider that nearly every town and city in the country is periodically afflicted in the same manner, and from the same cause. Investigation into the cause of this trouble in many of the eastern cities, by experts, has led to a theory now almost universally accepted, that it is caused by the decay of a low form of aquatic vegetation, resulting subsequently, in fermentation of the water. All authorities on the subject agree that the water at such times, while disagreeable, *contains nothing deleterious to health.*

MAIN PIPES.

The line of 30-inch main pipe, laid from the pumping works to the intersection of Water and Superior streets in 1890, has been extended through Superior and Erie streets, Euclid avenue, Brownell and Scovill streets to Willson ave nue, and in Willson avenue from Scovill to Quincy street. A 24-inch pipe has also been laid in Willson avenue from Garden street to Quincy street, where it is connected with a 36-inch Y pipe, from which a main of that size is to extend out Quincy street to the new reservoir.

At the intersection of Ontario and Superior streets, a 20-inch connection was made between the 30-inch and old 20-inch main. A similar connection was made at Erie street and Euclid avenue. A 20-inch branch was laid in Euclid avenue at Brownell street ready for extension east at any time in the future. At Forest street and Scovill avenue, a 12-inch branch was laid north, and one of 16 inches laid south from the 30-inch main, the 10-inch pipe in Scovill avenue was also connected with this 16-inch branch. A 30-inch branch was laid in Willson avenue, south of Scovill, to which another main of the same size, running across the city, south of Woodland avenue, may be connected at some future time. A 24-inch cross was also put in the main of that size in Garden street and Willson avenue, providing for another main from the north. To these branches other mains can be attached, as the increase in the use of water may require, without interrupting the supply to make new connections.

The length of 30-inch main pipe laid was 15,003 feet, at a cost of $137,217.44, including gates, special castings, and every other expense necessary to complete the same, making the cost per foot $9.14 6-10. The length of 24-inch main laid was 1,009 feet, at a total cost of $7,056 50 or 6.99 3-10 per foot, the total cost of both pipes was, therefore, $144,273.94, the estimated cost was $155.000.

Including twenty-eight feet of 20-inch, and seventy-three feet of 16-inch, there was laid during the year 16,113 feet, or three miles 273 feet of main, besides 955 feet of 16-inch cast iron pipe laid to replace the same length of wrought iron cement-lined pipe.

With the exception of one pipe broken at the westerly line of Monumental Park, by the settlement of the ground, where the pipe laid last year was connected with that laid through the Park two years before, there has not been a leak up to this time in all the main pipe laid during the year. This fact is mentioned as a just recognition of the care and skill of the men who had immediate charge of testing and laying the pipes.

The total length of main pipe now in use, from 16 inches to 36 inches in diameter, is 13 miles 3,019 feet.

I would again urge the necessity of laying a new 30-inch main pipe from the pumping works south, for the supply of the south and west sections of the city.

DISTRIBUTING PIPE.

The length of distributing pipe of the different sizes, from 3 inches to 12 inches diameter, laid during the year, was 12 miles 4,346 feet, making the total length of that kind of pipe now in use, 139 miles 1,883 feet, which, added to main pipe laid, makes a total of 152 miles 4,902 feet.

During the year 1 mile 4,794 feet of pipe was relaid.

In addition to the labor performed in laying pipe, it will be seen by the accompanying table that pipe has been lowered in a large number of streets, making, in the aggregate, a length of 5 miles 1,764 feet.

In connection with this work, 1,052 service pipes, having a total length of 4 miles 4,356 feet, were lowered to a depth below any danger of frost. The total length of trench opened, to an average depth of six feet, was nearly 28 miles.

STOP GATES.

The number of new stop gates set was 333, of this number, 41 were set to take the place of smaller or defective ones removed.

The total number now in use is 2,741. Of these 79 are in main pipe lines, 12 of which were set during the past season.

FIRE HYDRANTS.

There are now in use 1,264 public fire hydrants, 140 of these were added during the past year, and 26 have been changed from 3-inch to larger sizes.

The accompanying tables give detailed information regarding the work above described.

SERVICE PIPES.

The number of new service connections made with the distribution pipes was 1,392, in addition to these 62 abandoned numbers were re-issued. The total number of connections of all sizes is now 14,492. There are 1,569 connections turned off, some are not extended beyond the stop-cock and others are abandoned. The number in use on the last day of December was 12,923, an increase for the year of 1,437.

CONNECTIONS MADE IN 1882.

⅝-inch,	1316
¾ "	13
1 "	13
1¼ "	2
1½ "	4
2 "	18
3 "	14
4 "	12
Total in 1882,	1392

TOTAL CONNECTIONS.

⅝-inch,	13637
¾ "	427
1 "	135
1¼ "	9
1½ "	32
2 "	117
2½ "	2
3 "	55
4 "	77
6 "	1
Total of all sizes,	14492

METERS.

During the year, 215 new meters have been set. These, added to the number previously in use, make a total of 702 belonging to this Department.

There are 57 hydraulic elevators and 2 organ motors, to each of which is attached an indicator for recording the quantity of water used.

The following table gives the kind, size and number of meters in use.

Kind of Meter	¾ in	1 in.	1½ in	2 in.	3 in.	4 in.	Tot'ls
Worthington Piston	303	175	68	76	38	8	668
Ball & Fitts Piston	7	3					10
Ball & Fitts Rotary	3	1		1	1		6
Union Piston	1	1					2
Crown Rotary	5	11					16
Totals	319	191	68	77	39	8	702

The increase in the quantity of water measured in 1882 over 1881 was 111,738,750 gallons. The total quantity measured last year was 927,341,250 gallons — being an average of 2,540,661 gallons per day, or a little more than one-fifth of all the water pumped.

The quantity of water that may be used daily by the payment, semi-annually, of the different sums named, is shown in the following table:

Semi-annual Payment.	Gallons per day.	Semi-annual Payment.	Gallons per day.
$5 00	275	$16 00	880
$6 00	330	18 00	989
7 00	384	20 00	1,098
8 00	440	22 00	1,207
9 00	494	24 00	1,320
10 00	549	26 00	1,428
12 00	660	28 00	1,536
14 00	768	30 00	1,648

DISTRIBUTION

The total quantity of water pumped during the year 1882 was 4,494,538,536 gallons, being a decrease of 352,670,827 gallons, or nearly one million gallons per day from the year 1881; while the increase in the number of water takers was 1,437, or 11 12-100 per cent.; the decrease in the quantity of water pumped amounted to 7 27-100 per cent.

This decrease is due, in part, to each of the following causes, namely: The mild winter weather during the year, making it unnecessary to allow water to run to keep service pipes from freezing; the mild summer weather, with frequent rains, reducing the quantity of water required for lawn and street sprinkling; and lastly, to the saving of waste directly effected at the places where meters were set, and in-directly the moral effect of the setting of meters upon others who were wasteful.

There is no doubt that a few meters set in a neighborhood, from time to time, have the effect of making all other water takers, who are knowing to the fact, more careful to guard against waste. The average water taker who pays for water by assessment rates, has a natural horror of water meters, but an inspection of the table under the head of meters, will convince anyone that measured water is a cheap commodity. The most ardent advocates of meters are, generally, those who pay for measured water.

The cost of pumping each million gallons 100 feet high was $5.08.

EXTENSION OF WORKS.

The location of the new low service reservoir at Fairmount street having been decided, a portion of the land has been purchased, and appropriation suits have been commenced to acquire possession of the remainder.

Surveys are now being made, and plans and specifications will be prepared as soon as practicable, so that the work may be commenced at an early day.

To complete the entire enlargement and extension of the works as contemplated, within the time in which it can be done, it will be necessary to place a large portion of it under contract during the coming spring, and I can see no good reason why there should be any further delay than may be necessary to issue and dispose of the bonds and let the contracts, for a large part of the work.

I would, therefore, recommend that contracts be let as follows:

For the 36-inch main from Willson avenue to the low service reservoir at Fairmount street; for the 30-inch main from the high service pumping works to the high service reservoir;

for the high service engine and boilers; for the extension of the boiler house at the old pumping works; for a ten million gallon pumping engine and three boilers for the low service pumping works, and, as soon as plans and specifications can be prepared, for the construction of the high and low service reservoirs, and high service engine and boiler house.

With these parts of the works under construction, the whole can be so nearly completed that water may be furnished to the high service district within two years.

A large number of petitions for pipe, carried over from last year, that could not be granted on account of the lateness of the season when received, will, if granted, enable the pipe layer to make an early beginning.

In view of the large amount of work of this nature that may certainly be anticipated during the year, I would suggest that the contract for the season's supply of distributing pipe be let as soon as bids can be received.

The funds at your command will enable you to lay a large quantity of such pipe, and thus afford water facilities to streets and districts not now supplied.

Respectfully submitted.

JOHN WHITELAW,
Superintendent and Engineer.

Cleveland, O., February 6th, 1883.

REPORT OF THE
ENGINEER IN CHARGE
OF THE
PUMPING WORKS.

To the Trustees of Cleveland Water Works:

Gentlemen. The year just closed has been a very uneventful one at the pumping works. The boilers and machinery having always been ready to meet the demands upon this department in a manner satisfactory to those in immediate charge, and, I trust, to your honorable body.

HENDERSON ENGINES.

As recommended in my last report, the Henderson engines were withdrawn from regular service, April 6th, for repairs. Owing to the crowded condition of the machine shops this work was not completed until June 1st. The nature of the repairs consisted chiefly in refitting the trunk pistons and putting in new piston rings, so adjusted as to allow the piston perfect freedom to follow the bore of the cylinder, just the reverse of the original plan, which attempted to hold the piston in a central position, without regard to mechanical imperfections incident to the peculiar construction of the engines. Subsequent experience has proved this change highly beneficial, as the engine is relieved of a large amount of unnecessary friction. This improvement has only been applied to the north cylinder; the condition of the other piston was such that immediate attention did not seem necessary. At the proper time, however, with your approval, I shall make the same change in the south piston.

No. 1 Worthington Engine.

Continues to give good satisfaction. Six and a half years of of almost constant work has failed to develop any of the defects pointed out by those self-styled mechanical engineers who advertized their ignorance so extensively through the city papers at the time these engines were in course of erection.

No. 2 Worthington Engines.

At the date of my last annual report No. 2 engine had just been started to see that everything was in working order, previous to putttng the walnut lagging upon the cylinders, &c., since that time they have been completed in a manner highly complimentary to the builders, and satisfactory to those in charge. Reference to the tables showing duty of the separate engines will show a duty for these engines much greater than No. 1 has shown. Much of this difference is due to improvements upon the engines, but the greater share can be attributed to the great evaporating power of the boilers attached to this engine.

The Cornish Engines.

These old patriarchs still occupy a prominent place on our list of machinery. Their days of usefulness, however, are about numbered, unless steps are taken to lower their suction pipes. The reasons for this are clearly set forth in my annual report for 1881, and the practicability of doing it has been carefully considered by your superintendent and myself, in which we agree that it can be successfully done. With this accomplished, many years of valuable service may reasonably be expected. They are in good repair and running whenever the demand will admit.

ENGINE REPAIRS.

The repairs upon the Henderson engine previously referred to are included in the item Engine House Repairs. The other engines needed only such repairs as could be made at the works with our regular force, the expense of which will appear in the secretary's report of pumping department running expenses.

BOILERS.

Our boiler capacity remains the same as last year, viz, two cylinder tubular, seven marine tubular, and six Cornish, all in good repair. Very little expense has been necessary the past year to keep them in order.

The same lack of capacity exists in the south building, mentioned in my last report, and I see no remedy for this evil aside from that recommended at that time.

RECOMMENDATIONS, ETC.

In my report for 1881 your attention was called to our inadequate pumping capacity. In that report it was recommended that the pumping facilities be increased by at least one ten million gallon pump, and three boilers for the same. I need only to say here that the same reasons that prompted those suggestions at that time, still exist. The same dangers stare us in the face At times we are obliged to run every available engine to keep up the supply. Therefore, in view of the fact that a new engine cannot be secured in time for the coming warm weather, I would recommend that the Cornish pump suctions be extended at once, so that these engines may be of service again. They occupy valuable space and considerable expense has been incurred resetting the boilers in the new boiler house; also making steam pipe and other connections. A comparatively small additional outlay in this direction will throw another safeguard around our present somewhat dangerous circumstances.

The experiences of the past year confirm my opinions, as expressed in my report for 1881, in regard to a new ten million gallon pump with boilers, boiler house, etc. I am aware that all this is contemplated in connection with the new reservoir and general extension of the works, but as we cannot expect to enjoy the benefits of all these improvements within the next two years, I would suggest that the extension of the pumping works should receive your earliest attention, without regard to the reservoir. If the new reservoir was available at this time, the present pumping capacity wonld be sufficient for some time to come, but with no storage, we should have machinery held in reserve of a capacity 50 per cent. in excess of the maximum quantity of water used.

Schedule showing gallons of water pumped and coal consumed in pumping, percentage of coal consumed and water pumped by each engine, contract price of coal, coal consumed, and cost of coal for raising one million gallons into reservoir.

Engines.	Gallons of water pumped by different engines.	Pounds of coal consumed by different engines.	Per cent. of water pumped by the different engines.	Per cent. of coal consumed by the different engines.	Per cent. of coal consumed pumping 1,000,000 gallons of water into reservoir.	Contract price of coal, per ton.	Cost of raising 1,000,000 gallons into reservoir.	Year
No. 1 Worthington	2,163,683,440	7,138,200	48.15	46.19	32.99	$1 45	$2.39	1882
No. 2 Worthington	1,570,905,160	4,393,510	34.94	28.43	27.97	"	2.03	"
Henderson	712,270,101	3,712,900	15.84	24.02	52.13	"	3.78	"
Cornish	47,679,735	210,000	1.07	1.36	14.04	"	3.19	"

Since my report for 1881, our blacksmith shop has been partially provided with tools, viz.: A forge, bellows, anvil and other miscellaneous small tools, accessories to such an establishment; but our machine shop is just the same as at the date of my last report. The present year will doubtless see this shop provided with such tools as our necessities require, and will be highly appreciated by us.

Tables giving the amount of work done by the different engines during the past year, also showing all the work done since the works were started, are herewith appended, to which your attention is invited.

Respectfully submitted.

R. DOTY, *Engineer in Charge.*

TABULAR STATEMENTS.

The following pages contain tabular statements showing the work of engines, distribution of water, extension and laying of pipes, location and number of stop gates and hydrants set, abstract of expenditures, &c.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882.

Side.	Size.	Street	Between what points.	Feet Laid.	Total.	Remarks.
West	30 in.	Brownell	From E. end of 30 in. bend at Euclid ave. to 30 in. valve at Scoville ave	2,079		
West	30 in.	Erie	From E. end of 30 in. bend at Superior st. to S. end of 30 in. bend at Euclid ave	825		
South	30 in.	Euclid	From S. end of 30 in. bend at Erie st. to E. end of bend at Brownell st	1,382		
North	30 in.	Scovill ave	From valve at Brownell st. to 30 in. T at Willson ave.	7,257		
South	30 in.	Superior	From 55 ft. E. of Water st. to Public Square to connect with pipe laid in 1880	1,326		
South	30 in.	Superior	From 60 ft. W. of E. side Public square to E. end 30 in. bend at Erie st	1,404		
East	20 in.	Willson ave	From T at Scovill ave to S. L. of Scovill ave from the east	98		
East.	30 in.	Willson ave	From T at Scovill ave to angle of Y at Quincy st	632	15,003	
East	24 in.	Euclid ave	From W. end of Y at Quincy st to N. end of 24 in. cross at Garden st	1,009	1,009	

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side.	Size.	Street.	Between what points.	Feet Laid.	Total.	Remarks.
South	20 in.	Euclid ave	From 30 in. to 20 in. T in Erie, west to connect to old 20 in. pipe	28	28	
West	16 in.	Forest	From 30 in. to 16 in. cross in Scovill ave. to 35 ft. S. of Scovill ave	73		
North	16 in.	Franklin ave	From 75 ft. W. of Pearl to valve at Russia st	487		Relaid C.
North	16 in.	Ohio	From 28 ft. E. of Woodland ave. to 6 ft. W. of Erie st.	468	1,028	Relaid C.
West	12 in.	Forest	From 30 in. to 16 in. cross in Scovill ave. to 12 ft. N. of of Scovill ave	31	31	
North	10 in.	Euclid ave	From pipe in Fairmount st. to E. L. of Adelbert ave	1,372		
West	10 in.	Forest	At Scovill ave. to connect 16 in. and 10 in. pipes	18		
South	10 in.	Prospect	From 244 E. of Perry st. to W. L. of Sterling ave	1,693		Relaid C.
South	10 in.	Prospect	From E. L. of Sterling ave. to pipe in Case ave	2,591	5,674	
West	8 in.	Adelbert ave	From pipe in Euclid ave., south	1,052		
West	8 in.	Bolton ave	From 6 ft. south of Euclid, south, to 1,618 ft. south of Cedar ave	2,037		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side.	Size.	Street	Between what points.	Feet Laid.	Total.	Remarks.
South.	8 in.	Cedar ave	From W. L. of south Dunham ave to pipe in south Dunham	31		
South	8 in.	Clark ave	From Cross in Ash to cross in Gordon ave	2,976		
East	8 in.	Custead ave	From 31 ft. N. of Euclid ave., north	1,283		
East	8 in.	Erie	From pipe in Lake st. to N. L. St. Clair st	610		
East	8 in.	Erie	From pipe in Superior st. to cross in Prospect st	1,450		
East	8 in.	Erie	From cross in Prospect to 6 ft. N. of S. L. of Eagle st	972		C. & I. relaid, 4 in. to 8 in.
South	8 in.	Eagle	From 8 in. pipe in Erie west to connection valve	19		C. & I. relaid, 4 in. to 8 in.
South	8 in.	Garden	From pipe in Brenton st to 389 ft. W. of Giddings ave.	730		
South	8 in.	Garden	From pipe in Second ave to pipe in South Dunham ave.	704		
South	8 in.	Garden	From pipe in First ave., west...	191		
East	8 in.	Gordon ave	From pipe in Lorain st. to pipe in Clark ave	1,841		
North	8 in.	Hamilton	From 8 in. pipe in Lawrence st., east to 4 in. pipe	12		
South	8 in.	Lake	From pipe in Case ave. east to 548 ft. east of Belden st	1,617		
South	8 in.	Lake	From pipe in Marquette st. to 24 ft. W. of Marquette st	80		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side.	Size.	Street.	Between what points.	Feet Laid.	Total.	Remarks.
West	8 in.	Lawrence	From pipe in St. Clair st. to pipe in Lake st	898		
East	8 in.	Lawrence	From pipe in Lake st. to 38 ft. S. of N. L. Lake st	30		Relaid, 6 in. to 8 in. I.
North	8 in.	Lorain	From W. L. of Pearl st. to 3 ft. W. of Willett st	2,370		6 in. to 8 in. C.
East	8 in.	Marquette	From pipe in St. Clair st. to 282 ft. N. of Lake st	1,418		
East	8 in.	East Madison ave	From T in Woodland ave., south	178		
East	8 in.	Seneca	From S. L. of Rockwell to 36 ft. south of St. Clair st	344		
East.	8 in.	Seneca	From S. L. of St. Clair st., south	36		Relaid, 4 in. to 8 in. I.
	8 in.	Superior	To connect 30 in. & 8 in Pipe, 25 ft. east of Public Sq.	36		
South	8 in.	St Clair	From pipe in Willson ave to pipe in Marquette st	233		
	8 in.	Wade Park	From pipe in Euclid ave to N. L. of Euclid ave. and 290 ft. E. of Stearns ave	37		
West	8 in.	Willson ave	From S. L. of St. Clair to cross in St. Clair St	45	22,139	
West	6 in.	Alabama	From N. L. of Lake st, north	178		Relaid, 4 in. to 6 in. I.
East	6 in.	Baden	From pipe in Quincy st. to pipe in Garden st	1,059		
North.	6 in.	Beaver	From pipe in Ocean st. to pipe in Pier st	203		
East	6 in.	Belden	From S. L. of Payne ave. to pipe in Mason st	1,289		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side	Size	Street	Between what points.	Feet Laid.	Total.	Remarks.
East	6 in	Belden	From pipe in St. Clair st. to N. L. of Superior st	1,082		
South	6 in.	Bolivar	From pipe in Erie st. to E. L. of Erie st	45		Relaid, 4 in. to 6 in. I
		Bolton allotment				
East	6 in.	1st st. W. of Giddings ave	From pipe in Garden st., south	28		
West	6 in.	Brenton	From pipe in Garden st. to 150 ft. S. of Cedar ave	1,350		
East	6 in.	Brown	N. L. of Woodland ave. to pipe in Platt st	778		
South	6 in	Burwell	Cross in Forest st. to T in Case ave	1,080		
East	6 in.	Case ave	Cross in Hamilton st to T in Lake st	510		
East	6 in.	Case ave	From 15 ft. N. of S. L. King st., north	290		
South	6 in.	Castle ave	From cross in Jennings ave. to 12 ft. W. of E. L. Abram st	702		
East	6 in	Cemetery	From pipe in Quincy st to N. L. of Scovill ave	584		
East	6 in	Case ave	From pipe in Prospect st. to N. L. of Prospect st	46		Relaid, 6 in. I and 6 in. C.
East	6 in.	Chapel	From pipe in Scovill ave., south	32		
North	6 in	Cook	From T in Burton st to 16 ft. W. of Burton st	52		Relaid, 4 in. to 6 in. I.
North	6 in	Cook	From 16 ft W. of Burton st. to E. L. of Harbor st	763		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side.	Size.	Street.	Between what points.	Feet Laid.	Totals	Remarks.
West	6 in.	Dare	From N. L of Lorain to 46 ft. S. of Franklin ave	2,343		
East	6 in.	Davies	From Cistern T at at Broadway, north	1,017		
East	6 in	Edwards	From T in Woodland, north	495		
North	6 in.	Elizabeth	From cross in Willson ave. to 19 ft. W. of Willson ave	61		
East	6 in.	Erie	From 6 ft S. of Eagle st. north	12		Relaid, 4 in. to 6 in. I.
South	6 in.	Finn	From N. L. of Broadway to pipe in Nursery st	515		
East	6 in.	First ave	From cross in Quincy to cross in Scovill ave	640		
West	6 in.	Giddings ave	From cross in Quincy to cross in Garden st	1,012		
East	6 in	Grove	From pipe in Orange st. to pipe in Croton st	600		
East	6 in.	Guernsey	From S L. of Lorain st., south	424		
East	6 in.	Hayward	From pipe in Prospect st. to S. L. of Prospect st	31		
East	6 in.	Independence	From pipe in Broadway to 100 ft. E. of Holly st	1,348		
West	6 in.	Jennings	From S. L. of Jerry st. to 138 ft. N. of Clark ave	924		
South	6 in.	Jerry	From T in Scranton ave. to cross in Jennings ave	1,331		
East.	6 in.	Kirtland	From pipe in Payne ave. to T in East Court	547		
West	6 in.	Liberty	From N. L. of Lorain to 590 N. of Bridge st	1,595		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side	Size.	Street.	Between what points.	Feet Laid	Totals	Remarks
East	6 in	Linden	From pipe in Woodland to S. L. Woodland	55		Relaid, 4 in. to 6 in. I
West	6 in	Linden	From S. L. Woodland ave., S. to connect pipe	579		
North	6 in	Long	From pipe in South Water to 15 ft. E. of 6 in. valve which			
			is 768 ft. W. of Seneca st	477		Relaid, 4 in. to 6 in. I
East.	6 in	Maple	From pipe in Woodland ave. to S. L. Woodland ave	55		Relaid, 4 in. to 6 in. I.
South.	6 in	Mason	From pipe in Belden st. to pipe in McHenry st	334		
North.	6 in	Monroe	From T in Green st. to E. L. of Willett st	418		
North	6 in	Moore	From pipe in Hicks st. to pipe in Hurd st	424		
East	6 in	McLean	From S. L. of Lorain to 8 ft. N. of Lorain st.	74		Relaid, 4 in. to 6 in. I.
East	6 in	New	From pipe in Quincy st. to 12 ft. N. of S. L. Garden st	984		
East	6 in	North Perry	From cross in Payne ave. to T in Euclid ave	1,517		
		Payne allotment				
North	6 in	1st street N. of Euclid	From pipe in Perry st. east	27		
North.	6 in	2d street N. of Euclid	From pipe in Perry st. east	27		
East	6 in	Nursery	From pipe in Finn st. north	1,156		
West	6 in	Ocean	From T in Woodland ave. to 14 ft. S. of Woodland ave	46		Relaid, 4 in. to 6 in I
West	6 in	Ocean	From 14 ft. S. of Woodland ave. to 11 ft. south of N. L.			
			of Bushnell st	916		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side.	Size.	Street.	Between what points.	Feet Laid.	Totals.	Remarks.
South.	6 in.	Ohio	From pipe in Central Way to 32 ft. W. of Scowden st.	310		
East	6 in.	Pier	From T in Beaver st. to N L. of Beaver st.	19		
West	6 in.	Public Square	From 137 ft. S. of Superior st., south	104		
South	6 in	Public Square	From pipe in Ontario st., west	277		
South	6 in	Platt	From pipe in Brown st to connect pipes at C. & P. R. R.	334		
East	6 in.	Penn	From pipe in Lorain st to N. L. of Lorain st.	25		Relaid, 4 in. to 6 in. I.
East	6 in	Richland ave	From 6 ft. N. of Quincy to 12 ft. N. of S L. of Garden st	955		
West	6 in	Russell ave	From N. L. Euclid ave. to S. L. of Hough ave	1,494		
East.	6 in	Slater ave	From pipe in Quincy st. to N. S Woodland ave	1,938		
North	6 in	Scovill ave	From cross in Florence st. to W. L Dike st	293		
East	6 in	Second ave	From pipe in Garden st. to N. L. Garden st	54		
East.	6 in.	Sawtell ave	From 12 ft. S. of Woodland ave., south	7		
East.	6 in.	Schieley Court	From 486 ft. N. of E. Prospect st., north	131		
South	6 in.	Sibley	From pipe in Sterling ave. to E. L. Sago st	516		
South.	6 in.	Sixth ave	From 6 ft E. of Willson ave	800		
East.	6 in.	South Dunham ave	From pipe in Garden st. to pipe in Willson ave	1,723		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side	Size.	Street.	Between what points	Feet Laid.	Totals	Remarks.
West	6 in	Stearns ave	From pipe in Euclid ave. to 8 ft. S. of Euclid ave	55		
East	6 in	Sterling ave	From cross in Payne ave., south	1,008		
East	6 in	St. Paul	From S. L. of Washington st. to 27 ft. S. of N. L. Washington st	39		
West	6 in	Taylor	From N. L. of Detroit to T in Washington st	304		
West	6 in	Taylor	From cross in Bridge st. to N. L. of Lorain st	628		
South	6 in	Trumbull	From T in Solon st., south	1,233		
East	6 in	Ward	From pipe in Lorain st. to S. L. of Lorain	40		Relaid, 4 in. to 6 in. L.
South	6 in	Washington	From pipe in Taylor st. to 95 ft. W. of Weddell st	1,923		
East	6 in	Water	From pipe in Main to 11 ft. N. of S. L. of Front st	327		
East	6 in	Woodland Court	From pipe in Woodland ave. to S. L. of Woodland ave	44		
		For Hydrants		105	44,900	
South	4 in	Church	From pipe in State st. to pipe in Duane st	629		
East	4 in	Duane	From pipe in Church st. to hydrant at Detroit st	169		
South	4 in	East Court	From T in Kirtland st., east	402		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1882—Continued.

Side.	Size.	Street.	Between what points.	Feet Laid.	Totals.	Remarks.
West	4 in	East Court alley	From T in East Court south	330		
East	4 in.	Lawrence	From 4 in. cross in Hamilton st., north	13		
West	4 in.	Sked	From cross in Marion st. to S. L. Garden st	337		
West	4 in.	Wall	From S. L. of Detroit st., south	4		
		For Hydrants	Cistern connections	1,908	3,792	
East	3 in	Garden Place	From N. L. of Garden st., north	283		
		For Hydrants		6		
					289	
					93,898	

SCHEDULE OF PIPE TAKEN UP AND RELAID IN 1882.

Diameter of Pipe Taken up	Diameter of Pipe Relaid.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
4 inches.	6 inches	Alabama street	From N. L. Lake street	178		
4 "	6 "	Bolivar street	" pipe in Erie street to 6 ft. E. of Erie street	45		
6 "	8 "	Case avenue	" " in Prospect st. to N. L. of Prospect st.	46		
4 "	6 "	Cook street	" T in Burton street to 16 ft. W. of Burton st.	52		
4 "	8 "	Erie street	" Cross in Prospect st. to ft. N. of S. L. Eagle	972		
4 "	6 "	Erie street	" 6 ft. S. of Eagle street north	12		
4 "	8 "	Eagle street	" 8 in. pipe in Erie st., W. to con. valve	19		
16 "	16 "	Franklin avenue	" 75 ft. W. of Pearl st. to valve at Russia st	487		
6 "	8 "	Lawrence street	" pipe in Lake st. to 38 ft. S. of N. L. of Lake st	30		
6 "	8 "	Lorain street	" W. L. of Pearl st. to 3 ft. W. of Willett st	2,370		
4 "	6 "	Linden street.	" pipe in Woodland av. to N. L. Woodland av.	55		
4 "	6 "	Long street	" " in S. Water st. to 753 ft. W. of Seneca st	477		
4 "	6 "	Maple street.	" " in Woodland av. to N. L. Woodland av	55		
4 "	6 "	McLean street	" S. L. of Lorain st. to 8 ft. N. of Lorain st...	74		
16 "	16 "	Ohio street	" 28 ft. E. of Woodland av. to 6 ft. W. of Erie st	468		
4 "	6 "	Ocean street	" T in Woodland av. to 14 ft. S. of Woodland av	46		

SCHEDULE OF PIPE TAKEN UP AND RELAID IN 1882.—Continued.

Diameter of Pipe Taken up.	Diameter of Pipe Relaid.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
10 inches	10 inches	Prospect street	From 244 ft. of Perry st. to W. L. of Sterling av	1,693		
10 "	10 "	Prospect street	" E. L. of Sterling av. to pipe in Case av	2,591		
4 "	6 "	Penn street	" pipe in Lorain st. to N. L. of Lorain st	25		
4 "	8 "	Seneca street	" S. L. of St. Clair street, south	38		
4 "	6 "	Ward street	" pipe in Lorain st. to S. L. of Lorain st	40		
3 "	4 "	Pipe for hydrants taken up		303		
					10,074	

TOTAL FEET OF PIPE LAID TO DECEMBER 31st, 1882.

Diameter of Pipe in Inches	36	30	24	20	16	12	10	8	6	4	3
Laid previous to 1882 ..	2,000	20,037	9,980	10,974	12,555	8,498	68,083	117,204	325,020	133,686	15,000
Laid in 1882 ..		15,003	1,000	28	1,028	31	5,674	22,139	44,500	3,792	295
Total	2,000	35,040	10,980	11,002	13,583	8,529	73,757	139,343	370,520	137,478	15,295
Taken up in 1882					955	...	4,284		2,446	2,086	393
Total in use	2,000	35,040	10,980	11,002	12,628	8,529	69,473	139,343	368,074	135,392	14,902
	71,659				735,803						

RECAPITULATION.

71,659 feet of Supply Main	equal to 13 miles—	3,019 feet
735,803 " " Distributing Main	" " 139 "	1,883 feet.
807,462	152 "	4,902 "
16,113 feet of increased Supply Main in 1882	equal to 3 miles—	273 feet
67,706 " " Distributing Main in 1882	" " 12 "	4,346 "
83,819 " " Mains in 1882	" " 15 "	4,619 "
10,074 feet of Pipe taken up and relaid of all sizes	equal to 1 mile	4,794 feet.

SCHEDULE SHOWING THE STREETS IN WHICH WATER PIPES WERE LOWERED IN 1882.

Side.	Size.	Street.	Location.	Feet Lowered	Total.
S.	8 in.	Broadway	From Ohio street to Liberal street	8,500	
W.	4 "	Bank street	" St. Clair street to 300 feet N. of Lake street	1,000	
		Broadway intersections		50	
		Bank street intersections		44	
E.	6 "	Case avenue	From Euclid avenue to Prospect street	440	
S.	6 "	Clinton street	" Taylor street to Liberty street	670	
S.	6 "	Detroit street	" Pearl street to Kentucky street	2,270	
S.	6 "	Detroit street	" Pearl street east	200	
		Detroit street intersections		171	
W.	4 "	Erie street	From Lake street to St. Clair street	590	
E.	10 "	Erie street	" St. Clair street to Superior street	700	
W.	4 "	Erie street	" Superior street to Euclid avenue	760	
E.	6 "	Erie street	" Eagle street to Woodland avenue pipe	1,150	
		Erie street intersections		512	
		Euclid ave. intersection at Kennard st		56	
N.	6 "	Euclid avenue	From Case avenue to Kennard street	700	

SCHEDULE SHOWING THE STREETS IN WHICH WATER PIPES WERE LOWERED IN 1882—Continued.

Side.	Size	Street.	Location.	Feet Lower'd.	Total.
W	4 in	Seneca street	From St. Clair street to Superior street	610	
		Seneca st. intersections		56	
E.	6 "	Pearl street	From Detroit street to Franklin avenue	1,250	
E.	8 "	Pearl street	" Franklin avenue to Chatham street	2,370	
E.	8 "	Pearl street	" Monroe street to Willey street	275	
		Pearl st. intersections		354	
S.	6 "	Woodland ave	From Ohio street to Willson avenue	9,120	
		Woodland avenue intersections		1,330	28,164

5 miles, 1,764 feet.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.

No.	Size.	Street.	Side	Location.	Remarks.
1	30 in.	Erie street	West.	21 feet south of Superior street and 34 feet east of W. L. of Erie st.	
1	30 "	Euclid avenue	South.	4 ft. west of Brownell street and 48 ft. north of S. L. of Huron st.	
1	30 "	Superior street	"	9 ft. west of Public Square and 39 ft, north of S. L. of Superior st.	
1	30 "	Scovill avenue	North.	On W. L. of Brownell st. and 48 ft. north of S. L. of Huron st.	
1	30 "	" "	"	18 ft, east of W. L. Greenwood st. and 12 ft. S. of N. L. of Scovill.	
1	30 "	" "	"	On E. L. of Forest st. and 27 ft south of N. L. of Scovill ave	
1	30 "	" "	"	5 ft. 10 in. W. of Willson ave. and 27 ft. S. of N. L. of Scovill ave	
1	30 "	Willson avenue	East.	On E. L of Scovill from the east and 33 ft. W. of E. L. of Willson av.	
1	30 "	" "	"	On S. L. of Quincy street and 33 ft west of E. L. of Willson ave.	
9	30 in.	Total 30 inch valves.			
1	24 "	Willson avenue	East.	N. L. of Quincy st. and 33 ft. west of E. L. of Willson av.	
1	20 in.	Detroit street	North.	65 ft. east of Hanover st., taken out	
1	20 "	Euclid avenue		22 ft. west of E. L. of Erie st. and 48 ft. N. of S. L. of Euclid av.	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	16 in.	Forest street	West.	S. L. of Scovill avenue and 27 ft. east of W. L. of Forest st	
1	12 "	Forest street	West.	On N. L. of Scovill avenue	
1	10 "	Euclid avenue	North.	E. L. of Fairmount street	
1	10 "	Euclid avenue	North.	E. L. of Stearns avenue	
1	10 "	Euclid avenue	North.	E. L. of Adelbert street	
1	10 "	Forest street	West.	10 ft. N. of S. L. Scovill and 22 ft. east of W. L. of Forest street	
1	10 "	Prospect street	South.	E. L. of Fern alley	
1	10 "	Prospect street	Connection valve 44 ft. W. of E. L. of Erie st. and 30 ft. S. of N. L. of Huron st		
6	10 in.	Total 10 inch valves			
1	8 "	Adelbert avenue	West.	On S. L. of Euclid avenue	
1	8 "	Bolton avenue	"	On N. L. of East Prospect street	
1	8 "	Bolton avenue	"	On S. L. of Cedar avenue	
1	8 "	Bolton avenue	"	1,130 feet south of Cedar avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	8 in.	Clark avenue	South.	On E. L. of Beech street	
1	8 "	Clark avenue	"	On E. L. of Hamburg street	
1	8 "	Clark avenue	"	On E. L. of Alum street	
1	8 "	Clark avenue	"	On E. L. of Gordon avenue	
1	8 "	Custead avenue	East.	On N. L. of Crawford street	
1	8 "	Erie street	"	On S. L. of Lake street	
1	8 "	Erie street	"	On S. L. of Superior street	
1	8 "	Erie street	"	On N. L. of Euclid avenue	
1	8 "	Erie street	"	On N. L. of Prospect street	
(4 to 8 in)	8 "	Erie street	"	4 feet south of Huron street	
1	8 "	Erie street	"	On S. L. of Bolivar street	
1	8 "	Garden street	South.	On W. L. of Giddings avenue	
1	8 "	Garden street	"	On E. L. of Giddings avenue	
1	8 "	Garden street	"	On E. L. of Ashland avenue	
1	8 "	Garden street	"	On E. L. of South Dunham avenue	
1	8 "	Gordon avenue	East.	On S. L. of Lorain street	
1	8 "	Gordon avenue	"	On S. L. of Prague street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side	Location.	Remarks
1	8 in	Gordon avenue	East	N. L. of Clark avenue	
1	8 "	Lake street	South	E. L. of Case avenue	
1	8 "	Lake street	"	On W. L. of Belden street	
1	8 "	Lake street	"	On W. L. of Marquette street	
1	8 "	Lawrence street	West	On N. L. of St. Clair street	
1	8 "	Lawrence street	"	On S. L. of Lake street	
1	8 "	Lorain street	North.	On E. L. of York street	
Old 8 in.	8 "	Lorain street	"	On W. L. of York street	
Old 8 in.	8 "	Lorain street	"	On W. L. of Jersey street	
Old 8 in.	8 "	Lorain street	"	On W. L. of Penn street	
1	8 "	Lorain street	"	On W. L. of Willett street	
1	8 "	Marquette street	East	On N. L. of St. Clair street	
1	8 "	Marquette street	"	On N. L. of Lake street	
1	8 "	East Madison avenue	"	On S. L. of Woodland avenue	
1	8 "	Ontario street	West	20 ft. N. of S. L. of Public Square and 11 ft. E. of W. L. of Ontario	
1	8 "	Superior street	South	26 ft. E. of Public Square and 34 ft. N. of S. L. of Superior st	
1	8 "	St. Clair street	"	On W. L. of Willson avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	8 in.	Wade Park		290 ft. east of Stearns ave. on N. L. of Euclid avenue	
39	8 in.	Total 8 inch valves			
1	6 "	Alabama street	West.	On north line of Lake street	
1	6 "	Baden avenue	East.	On north line of Quincy street	
1	6 "	Baden avenue	"	On south line of Garden street	
1	6 "	Belden street	"	On north line of Mason street	
1	6 "	Belden street	"	On south line of St. Clair street	
(4 to 6 in.)	6 "	Bolivar street	South.	On east line of Erie street	
1	6 "	Bolton allotment or 1st St. W. of Giddings avenue at Garden street	East.	2 feet south of Garden street	
1	6 "	Brenton street	West.	On north line of Garden street	
1	6 "	Brown street	East.	On north line of Woodland avenue	
1	6 "	Brown street	East.	On south line of Platt street	
1	6 "	Burwell street	South.	On east line of Forest street	
1	6 "	Burwell street	South.	On west line of Case avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1892.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in	Case avenue	East	On south line of Lake street	
1	6 "	Castle avenue	South.	On west line of Jennings avenue	
1	6 "	Castle avenue	South	On east line of Abram street	
1	6 "	Cemetery street	East	On south line of Quincy street	
1	6 "	Chapel street	"	On south line of Scovill avenue	
C 1 to 6 in. 1	6 "	Cook street	North.	On west line of Burton street	
1	6 "	Cook street	"	On east line of Harbor street	
1	6 "	Dare street	West.	On north line of Bridge street	
1	6 "	Dare street	"	On south line of Bridge street	
1	6 "	Dare street	"	On south line of Duke street	
1	6 "	Dare street	"	On north line of Lorain street	
1	6 "	Edwards street	East	On north line of Woodland avenue	
1	6 "	Elizabeth street	North.	On west line of Willson avenue	
C 4 to 6 in. 1	6 "	Erie street	East	On south line of Eagle street	
1	6 "	Finn street	South.	On east line of Broadway	
1	6 "	First avenue	East	On south line of Quincy street	
1	6 "	First avenue	"	On north line of Scovill avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Giddings avenue	West	On north line of Quincy street	
1	6 "	Giddings avenue	"	On south line of Garden street.	
1	6 "	Grove street	East.	On north line of Croton street	
1	6 "	Grove street	"	On south line of Orange street	
1	6 "	Hayward street	"	On south line of Prospect street	
1	6 "	Independence	"	On south line of Broadway	
1	6 "	Independence street	North.	On west line of Holly street	
1	6 "	Jennings avenue	West.	On north line of Castle avenue	
1	6 "	Jerry street	South.	On west line of Jennings avenue	
1	6 "	Jerry street	"	On east line of Abram street	
1	6 "	Jerry street	"	On east line of Scranton avenue	
1	6 "	Kirtland street	East.	On north line of Payne avenue	
1	6 "	Liberty street	"	On north line of Lorain street	
1	6 "	Liberty street	West.	On south line of Bridge street	
1	6 "	Liberty street	East.	On north line of Bridge street	
C 4to6in.1	6 "	Linden street	"	On north line of Woodland avenue	
C 4to6in.1	6 "	Long street	South.	On east line of South Water street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in	Long street	North	75 feet west of Seneca street	
C 4 to 6 in. 1	6 "	Maple street	East	On north line of Woodland avenue	
1	6 "	Mason street	South	On west line of Belden street	
1	6 "	Monroe street	North.	On east line of Willett street	
1	6 "	Moore street	"	On east line of Hicks street	
1	6 "	Moore street	"	On west line of Hurd street	
C 4 to 6 in. 1	6 "	McLean street	East	On north line of Lorain street	
C 4 to 6 in. 1	6 "	McLean street	"	On south line of Lorain street	
1	6 "	New street	"	On north line of Quincy street	
1	6 "	New street	"	On south line of Garden street	
1	6 "	North Perry street	"	On south line of Payne avenue	
1	6 "	North Perry street.	"	On north line of Euclid avenue	
1	6 "	Payne allotment or 1st st. north of Euclid ave	North.	On east line of North Perry street	
1	6 "	Payne allotment or 2nd st. north of Euclid ave.	"	On east line of North Perry street	
1	6 "	Nursery street	East	On north line of Finn street	
1	6 "	Nursery street	"	On north line of Glazier street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
C 4to6in.1	6 in.	Ocean street	West.	On south line of Woodland avenue	
1	6 "	Ocean street	"	On north line of Beaver street	
1	6 "	Ohio street	South.	On west line of Central Way	
1	6 "	Public Square	"	On west line of Ontario street	
C 4to6in 1	6 "	Penn street	East.	On north line of Lorain street	
1	6 "	Pearl street	"	On north line of Franklin avenue	
1	6 "	Pearl street	"	On south line of Church street	
1	6 "	Richland avenue	"	On north line of Quincy street	
1	6 "	Richland avenue	"	On south line of Garden street	
1	6 "	Russell avenue	West.	601 feet south of Hough avenue	
1	6 "	Slater avenue	East.	On south line of Quincy street	
1	6 "	Slater avenue	"	On north line of Scovill avenue	
1	6 "	Slater avenue	"	On south line of Scovill avenue	
1	6 "	Slater avenue	"	On south line of Cypress street	
1	6 "	Slater avenue	"	On north line of Woodland avenue	
1	6 "	Scovill avenue	North.	On east line of Florence street	
1	6 "	Sibley street	South.	On east line of Sterling avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No	Size.	Street	Side	Location.	Remarks.
1	6 in	South Dunham avenue	East	On south line of Cedar avenue	
1	6 "	South Dunham avenue.	"	North of second hydrant south of Cedar avenue	
1	6 "	South Dunham avenue	"	On north line of Garden street	
1	6 "	Stearns avenue	West.	On south line of Euclid avenue	
1	6 "	Sterling avenue.	East	On south line of Payne avenue	
1	6 "	Taylor street	West.	On south line of Bridge street	
1	6 "	Taylor street	"	On north line of Lorain street	
1	6 "	Trumbull street	South.	On east line of Solon street	
1	6 "	Trumbull street	"	South of 2d hydrant south of angle near Solon street	
(4to6in.)	6 "	Ward street	East.	On south line of Lorain street	
1	6 "	Washington street	South.	On west line of Taylor street	
1	6 "	Washington street	"	On east line of St. Paul street	
1	6 "	Washington street	"	On west line of St. Paul street	
1	6 "	Washington street	"	On east line of Weddell street	
1	6 "	Washington street	"	On west line of Weddell street	
1	6 "	Water street	East.	On south line of Front street, from the west	
1	6 "	Woodland Court	"	On south line of Woodland avenue	

SCEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Woodland avenue......	South.	On east line of Forest street....................................	
1	6 "	Woodland avenue	"	On east line of Maple street	
7	6 "	For hydrants			
105		Total 6 inch valves.			
1	4 "	Church street	South.	On west line of State street	
1	4 "	Church street	"	On east line of Duane street	
1	4 "	East court	"	On east line of Kirtland street..........................	
1	4 "	East court alley	West.	On south line of East court....	
1	4 "	Lawrence street.	East	31 ft S. of N. L. of Hamilton st. and 27 ft. W. of E. L. of Lawrence	
1	4 "	Sked street.	West.	On north line of Marion street	
1	4 "	Sked street.	"	On south line of Garden street....................................	
1	4 "	Seneca street	East.	36 ft. south of St. Clair st. and 46 ft W. of E. L. of Seneca street....	
159	4 "	For hydrant and cistern	Connections.		
167	4 in.	Total 4 inch valves.......			

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1882.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks
1	3 in	Garden place	East.	On north line of Garden street	
1	3 "	For hydrant in		Garden place	
2	3 in	Total 3 inch valves			

RECAPITULATION OF STOP GATES FOR 1882.

Water way in inches	36	30	24	20	16	12	10	8	6	4	3	Total.
Set previous to 1882	1	23	7	17	20	18	90	200	700	1,124	249	2,449
Set in 1882	.....	9	1	1	1	1	6	39	105	167	2	332
Total	1	32	8	18	21	19	96	239	805	1,291	251	2,781
Total taken out in 1882	.....	.....	.....	1	.....	.....	.....	.....	3	12	25	41
Total in use December 31st, 1882	1	32	8	17	21	19	96	239	802	1,279	226	2,740

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882.

No.	Size.	Street.	Feet	Location.	Side.
1	4 in.	Adelbert avenue	211	South of Euclid avenue	West.
1	4 "	" "	508	" " "	"
1	4 "	" "	1,005	" " "	"
1	4 "	Bolton avenue	402	" " "	"
1	4 "	" "	6	South of East Prospect street	"
1	4 "	" "	6	North of Cedar avenue	"
1	4 "	" "	354	South of " "	"
1	4 "	" "	750	" " "	"
1	4 "	" "	1,190	" " "	"
1	4 "	" "	1,618	" " "	"
(3 to 4 in.) 1	4 "	Bank		At Lake street	"
1	4 "	Baden	470	North of Quincy street	East.
1	4 "	Belden	365	South of Payne avenue	"
1	4 "	"	350	North of Mason street	"
1	4 "	"	320	South of St. Clair street	"
1	4 "	"	340	North of Superior street	"

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882—Continued.

No	Size.	Street.	Feet.	Location.	Side.
1	6 in.	Brownell street	24	South of N. L. Ohio street	East.
1	4 "	Brenton street	150	South of Cedar avenue	West.
1	4 "	" "	610	" " "	"
1	4 "	" "	400	North of Garden street	"
1	4 "	Brown street	294	North of Woodland avenue	East.
1	4 "	" "	6	South of Platt street	"
1	4 "	Burwell street	4	West of Short street	South.
1	4 "	" "	220	West of Case avenue	"
1	4 "	Clark avenue	50	West of Elk street	"
1	4 "	" "	6	East of Iona street	"
1	4 "	" "	56	West of Poplar street	"
1	4 "	" "	163	West of Hamburg street	"
1	4 "	" "		At Train street	"
1	4 "	" "	152	West of Alum street	"
1	4 "	Custead avenue	453	North of Euclid avenue	East.
1	4 "	" "	235	North of Crawford street	"

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882—Continued.

No.	Size	Street	Feet	Location.	Side.
1	4 in	Custead avenue	665	North of Crawford street	East.
1	4 "	Castle avenue	2	East of Newell street	South.
1	4 "	Cemetery street	179	South of Quincy street	East.
1	4 "	" "		At Scovill avenue	"
C 3 to 4 in 1	4 "	Chapel street	8	South of Scovill avenue	"
1	4 "	Cook street		At Myrtle street	North.
1	4 "	" "	2	East of Harbor street	"
1	4 "	Church street	265	East of Duane street	South.
C 3 to 6 in 1	6 "	Case avenue		At Prospect street	West.
C 3 to 4 in 1	4 "	Duane street	11	South of Detroit street	East.
1	4 "	Dare street	327	North of Lorain street	West.
1	4 "	" "	108	" Duke street	"
1	4 "	" "	201	" Bridge street	"
1	4 "	" "	579	" " "	"
1	4 "	" "	168	South of Franklin avenue	"
1	4 "	Davies street	329	North of Broadway	East.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882—Continued.

No.	Size.	Street.	Feet.	Location.	Side.
1	4 in.	Davies street	679	North of Broadway	East.
1	4 "	" "	1,017	" "	East.
1	4 "	Euclid avenue	362	East of Fairmount street	North.
1	4 "	" "		At Stearns avenue	"
1	4 "	" "	208	West of Adelbert avenue	"
1	4 "	" "	14	East of Case avenue	"
(3 to 4 in.) 1	4 "	" "		At Kennard street	"
1	4 "	Edwards street	461	North of Woodland avenue	East.
1	6 "	Erie street		At S. L of Lake street	"
1	6 "	" "	132	South of Walnut street	"
1	8 "	" "	28	South of Euclid avenue	"
1	6 "	" "	10	North of Huron street	"
(3 to 4 in.) 1	4 "	" "	143	South of Bolivar street	"
(3 to 4 in.) 1	4 "	" "		At Eagle street	"
(3 to 4 in.) 1	4 "	" "		At Ohio street	"
(3 to 4 in.) 1	4 "	" "		At Woodland avenue	West.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882—Continued.

No.	Size.	Street.	Feet.	Location.	Side.
1	4 in.	East Court	387	East of Kirtland street	North.
1	4 "	Finn street	9	East of Lester street	South.
1	4 "	First avenue	267	North of Scovill avenue	East.
1	6 "	Garden Place	277	North of Garden street	West.
1	4 "	Garden street		At Ashland street	South.
1	4 "	" "	20	West of Baden street	"
1	4 "	" "		At Brenton street ...	"
1	4 "	" "	330	West of Giddings avenue	"
1	4 "	Gordon avenue	124	South of Scholl street	East.
1	4 "	" "	191	North of Wine street	"
1	4 "	" "	188	South of " "	"
1	4 "	" "	3	North of Clark avenue	"
1	4 "	Giddings avenue	114	North of Montgomery street	East.
1	4 "	" "	11	South of Garden street	West.
1	4 "	Grove street	237	North of Croton street	East.
1	4 "	Guernsey street	434	South of Lorain street	"

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882—Continued.

No.	Size.	Street.	Feet.	Location.	Side.
1	4 in.	Independence	300	South of Broadway	East.
1	4 "	"	427	North of Holly street	"
1	4 "	"	35	" " "	"
1	4 "	Jennings avenue	15	" Castle avenue	West.
1	4 "	Jerry	60	West of Milton street	South.
1	4 "	"		At W. L. of Abram street	"
1	4 "	"		At E. L. of Newell street	"
1	4 "	Kirtland	76	South of East Court	East.
C 3 to 4 in. 1	4 "	Kennard		At Woodland avenue	West.
1	4 "	Lake	204	East of Case avenue	South.
1	4 "	"	272	West of Belden street	"
1	4 "	"	120	East of Belden street	"
1	4 "	"	348	" " "	"
C 3 to 4 in. 1	4 "	Lorain		At York street	North.
1	4 "	"		At Ward street	"
C 3 to 4 in. 1	4 "	"	21	East of Penn, from 70 ft. W. of Penn	"

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882. Continued.

No.	Size.	Street.	Feet.	Location.	Side.
1	4 in.	Lorain		At Green street	North.
1	4 "	Liberty	438	South of Bridge street	West.
1	4 "	Linden	292	North of Woodland avenue	"
1	4 "	Marquette	18	South of Hamilton street	East.
1	4 "	"	273	North of Hamilton street	"
1	4 "	"		At Lake street	"
1	4 "	"	282	North of Lake street	"
1	4 "	Mason		At Belden street	South.
1	4 "	Monroe		At Willett street	North
1	4 "	New	437	North of Quincy street	East
1	4 "	"	10	South of Garden street	"
1	4 "	North Perry	331	South of Payne avenue	"
1	4 "	" "	628	North of Euclid avenue	"
1	4 "	" "	202	" " "	"
1	4 "	Nursery		At S. L. of Glazier street	"
1	4 "	"	396	North of " "	"

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882.—Continued.

No.	Size.	Street.	Feet.	Location.	Side.
1	4 in.	Nursery	740	North of Glazier street	West.
1	4 "	Ocean	296	North of Beaver street	"
1	4 "	"		At Bushnell street	"
1	4 "	Ohio		At W. L. of Scowden street	North.
1	4 "	Public Square	60	West of Ontario street	South.
C 3 to 4 in 1	4 "	Pearl	275	North of Franklin avenue	East.
C 3 to 4 in 1	4 "	"	19	South of N L. Carroll street	"
1	4 "	Prospect	359	East of Perry street	South.
C 3 to 4 in. 1	4 "	"	784	East of Perry street, (80 feet of Old Hydrant)	"
C 3 to 4 in. 1	4 "	"	756	West of Sterling avenue, (171 feet west of Old Hydrant)	"
1	4 "	"	343	West of Sterling avenue	"
C 3 to 4 in 1	4 "	"	428	East of Sterling avenue, (190 feet west of old hydrant.)	"
1	4 "	"	363	West of Hayward street	"
C 3 to 4 in. 1	4 "	"		At Hayward, (from north to south side)	"
1	4 "	"	428	East of Hayward street	"
C 3 to 4 in. 1	4 "	"	413	West of Case avenue (165 feet east of old hydrant)	"

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882.—Continued.

No.	Size.	Street.	Feet.	Location.	Side.
1	4 in.	Richland avenue	467	North of Quincy street	East.
1	4 "	" "	3	South of Garden street	"
1	4 "	Russell "	320	North of Euclid avenue	West.
1	4 "	" "	710	" " "	"
1	4 "	" "	395	South of Hough avenue	"
1	4 "	" "		At Hough avenue	"
1	6 "	Seneca	68	North of Rockwell street	East.
1	4 "	Scranton avenue	180	South of Jennings avenue	"
1	4 "	Slater "	291	South of Quincy street	"
1	4 "	" "	298	South of Scovill avenue	"
1	4 "	" "	154	North of Woodland avenue	"
1	4 "	Scovill avenue		At W. L. of Dike street	North.
1	4 "	Sawtell "	19	South of Woodland avenue	East.
1	4 "	Sibley	45	West of Sago street	South
1	4 "	Sixth avenue	407	East of Willson avenue	"
1	4 "	" "	857	" " "	"

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882—Continued.

No.	Size.	Street	Feet.	Location.	Side.
1	4 in.	South Dunham	338	South of Cedar avenue	East.
1	4 "	" "	738	South of Cedar avenue	"
1	4 "	" "	50	South of Harriett street	"
1	4 "	" "	141	North of Garden street	"
1	4 "	Sterling avenue	377	South of Payne avenue	"
1	4 "	" "	827	" " "	West
1	4 "	Taylor	296	North of Lorain street	"
1	4 "	Trumbull	236	East of angle near Solon street	South.
1	4 "	"	658	" " " " "	"
1	4 "	"	1,105	" " " " "	"
1	4 "	Washington		At W. L. of Taylor street	"
1	4 "	"	102	West of Taylor street	"
1	4 "	"	367	East of Weddell street	"
1	4 "	"	93	West of Weddell street	"
1	4 "	Water		At Front street	East.
(3 to 4 in.)	4 "	Woodland avenue	358	West of Cross street	South.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1882—Continued.

No.	Size.	Street.	Feet.	Location.	Side.
[illegible]	4 in.	Woodland avenue	171	East of Erie street	South.
[illegible]	4 "	" "	52	West of Harmon street	"
[illegible]	4 "	" "	70	West of Chapel street	"
[illegible]	4 "	" "	175	East of Mayflower street	"
[illegible]	4 "	" "	208	East of Lees Court	"
[illegible]	4 "	Willey		Moved from S. E. corner to S. W. corner Willey and Columbus sts	North.

SCHEDULE SHOWING THE LOCATION OF HYDRANTS CHANGED IN 1882.

No.	Taken up.	Set.	Street.	Feet.	Location.	Side.
1	3 in.	4 in.	Bank		At Lake street	West.
1	3 "	4 "	Chapel	8	South of Scovill avenue	East.
1	3 "	6 "	Case avenue		At Prospect street	West.
1	3 "	4 "	Duane	14	South of Detroit street	East.
1	3 "	4 "	Euclid avenue		At Kennard street	North.
1	3 "	4 "	Erie	143	South of Bolivar street	East.
1	3 "	4 "	"		At Eagle street	"
1	3 "	4 "	"		At Ohio street	"
1	3 "	4 "	"		At Woodland avenue	West.
1	3 "	4 "	Kennard		" "	"
1	3 "	4 "	Lorain		At York street	North.
1	3 "	4 "	"	21	E of Penn street, (moved from 70 feet W. of Penn)	"
1	3 "	4 "	Pearl	275	N. of Franklin avenue	East.
1	3 "	4 "	"	19	S. of N. L. Carroll street	"
1	3 "	4 "	Prospect	784	E. of Perry street, (80 ft. E. of old hydrant)	South.
1	3 "	4 "	"	756	W. of Sterling, (171 feet west of old hydrant)	"

SCHEDULE SHOWING THE LOCATION OF HYDRANTS CHANGED IN 1882—Continued.

No.	Taken up	Set.	Street		Feet.	Location	Side
1	3 in.	4 in.	Prospect		128	East of Sterling, 100 feet W. of old hydrant	South.
1	3 "	4 "	"			At Hayward street, from N. to S. side	"
1	3 "	4 "	"		415	W. of Case avenue, 165 feet east of old hydrant	"
1	3 "	4 "	Woodland avenue		358	West of Cross street	"
2	3 "	4 "	"	"	171	East of Erie street	"
1	3 "	4 "	"	"	32	West of Harmon street	"
1	3 "	4 "	"	"	79	West of Chapel street	"
1	3 "	4 "	"	"	175	East of Mayflower street	"
1	3 "	4 "	"	"	208	East of Lee's Court	"
1	3 "	4 "	Willey			Moved from S. E. cor. to N. W. cor. of Willey and Columbus sts	North.
20							

RECAPITULATION OF HYDRANTS FOR 1882.

Hydrants set in 1882, 3 inch	1
Hydrants set in 1882, 4 inch	158
Hydrants set in 1882, 6 inch	7
Total Hydrants set in 1882	166
Total Hydrants in use December 31st, 1881	1,124
Total	1,290
Hydrants changed in 1882	26
Total Hydrants in use December 31st, 1882	1,264

CISTERN CONNECTED IN 1882.

Trumbull street, 6 feet E. of Solon and 24 feet N. of S. L. of Trumbull street.

WORTHINGTON DUPLEX ENGINE NO. 1, RECORD FOR 1882.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped.	Height in feet and Decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	31	742	30	325,713	2,600	645,100	647,700	201,912,000	158,024	41,212,931
February	28	672		296,766	3,000	571,800	574,800	165,394,920	157,777	37,975,430
March	31	739		320,850		660,900	660,900	198,914,600	157,373	39,619,974
April	30	720		302,419	1,900	588,200	590,100	167,039,780	156,941	37,109,678
May	31	743		284,155	12,000	636,100	648,100	173,880,860	156,709	35,182,143
June	18	385	20	144,163	2,600	307,600	310,200	92,481,000	157,228	39,209,746
July	31	744		312,225	1,800	624,900	626,700	193,579,500	157,473	40,687,744
August	31	744		329,530		646,500	646,500	201,308,600	157,236	41,564,799
September	30	718	55	308,544		604,900	604,900	191,297,280	157,553	41,678,248
October	31	734		287,938	2,000	672,300	674,300	178,521,500	157,898	34,967,953
November	30	719	30	275,323	2,000	539,500	541,500	170,700,200	158,289	41,739,056
December	31	744	40	295,968	2,000	610,500	612,500	225,622,900	158,825	48,958,530
Totals and average	353	8,405	45	3,489,812	29,900	7,108,300	7,138,200	2,162,083,140	157,449	39,904,779

WORTHINGTON DUPLEX ENGINE No. 2, RECORD FOR 1882.

MONTHS.	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and Decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	18	348	55	163,485	8,000	265,280	273,280	101,360,700	158,102	49,051,079
February	28	663	...	276,514	...	549,350	549,350	171,438,680	158,833	41,402,631
April	25	590	30	215,655	...	384,900	384,900	133,706,100	156,953	45,606,895
May	31	744	...	263,791	...	468,500	468,500	163,550,420	156,812	45,790,868
June	16	376	...	131,170	...	223,300	223,300	81,325,400	156,792	47,765,989
August	26	608	...	279,666	...	446,000	446,000	173,392,920	157,198	51,120,892
September	30	720	...	304,146	...	502,200	502,200	188,570,520	157,576	49,493,108
October	31	742	...	307,268	...	565,380	565,380	190,506,160	157,855	44,491,891
November	30	720	...	269,569	...	442,800	442,800	167,132,780	158,122	49,922,879
December	31	744	...	322,454	...	537,800	537,800	199,921,480	158,825	49,387,278
Totals and averages	266	6,256	25	2,533,718	8,000	4,385,510	4,393,510	1,570,905,160	157,707	47,400,346

CORNISH ENGINE RECORD FOR 1882.

EAST ENGINE.

MONTHS.	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and Decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
June	16	135	05	61,585	19,000	62,600	81,600	19,768,785	157.318	31,872,712
December	8	62	05	27,975	8,800	32,000	40,800	8,979,975	159.416	29,342,580
Totals and averages	24	197	10	89,560	27,800	94,600	122,400	28,748,760	158.367	30,607,655

CORNISH ENGINE RECORD FOR 1882.—Continued.

WEST ENGINE.

MONTHS.	PUMPING.				COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and Decimals.	Duty.
	Days.	Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
July	17	130	20	58,975	21,600	66,000	87,600	18,930,975	157 250	28,419,398
Totals and averages	17	130	20	58,975	21,600	66,000	87,600	18,930,975	157 250	28,419,398

CORNISH ENGINES RECORD FOR 1882.—Continued.

BOTH ENGINES.

ENGINES.	PUMPING.				COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and Decimals	Duty.
	Days.	Hrs.	Min.	Strokes.	Raising Steam.	Pumping	Total			
East Engine	24	197	10	89,560	27,800	94,600	122,400	28,718,760	158.367	30,607,655
West Engine	17	130	20	58,975	21,600	66,000	87,600	18,930,975	157.250	28,419,388
Totals and averages	41	327	30	148,535	51,400	160,600	210,000	47,689,735	157.808	29,513,526

HENDERSON DUPLEX ENGINE RECORD FOR 1882.

MONTHS.	PUMPING.				COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and Decimals.	Duty.
	Days.	Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	21	364	20	166,654	3,800	457,800	461,600	80,159,890	158 020	25,508,766
March	31	735	30	344,173	.....	1,003,300	1,003,300	184,132,555	157 382	24,139,654
April	6	129	30	56,398	....	153,400	153,400	39,172,930	156 908	25,792,694
June	29	658	....	336,200	3,000	1,027,700	1,030,700	183,901,400	157 051	23,486,352
July	31	744	..	378,744	2,000	988,300	990,300	207,172,968	157 473	27,553,395
August	3	64	.	32,414	....	73,600	73,600	17,730,458	157 444	31,751,872
Totals and averages	121	2,695	20	1,314,583	8,800	3,704,100	3,712,900	712,270,201	157.390	26,363,789

SCHEDULE SHOWING THE DISTRIBUTION OF WATER FOR EACH DAY AND MONTH IN THE YEAR 1882.

Months.	Gallons of water pumped by Cornish engine.	Gallons of water pumped by Henderson engine.	Gallons of water pumped by No. 1 Worthington engine.	Gallons of water pumped by No. 2 Worthington engine.	Gallons Distributed.			
					Per month.	Average per day.	Each inhabitant per day.	Each consumer per day.
January.		89,159,900	201,942,050	101,360,700	392,462,650	12,660,085	70 33	139 95
February			165,394,920	171,438,680	336,833,600	12,029,771	66 83	132 98
March		184,132,555	198,914,600		383,047,155	12,356,360	68 64	136 30
April		30,172,930	167,039,780	133,706,100	330,918,810	11,030,627	61 28	121 93
May			173,880,860	163,550,420	337,431,280	10,884,880	60 47	120 32
June	19,768,785	183,901,400	92,181,060	81,325,400	377,176,645	12,572,555	69 90	139.09
July	18,930,975	207,172,968	193,579,500		419,683,443	13,538,176	75 21	149 65
August		17,730,458	204,308,600	173,392,920	395,431,978	12,755,870	70 87	141 01
September			191,297,280	188,570,520	379,867,800	12,662,260	70 31	139 97
October			178,521,560	190,506,160	369,027,720	11,904,120	66 13	131 59
November			170,700,260	167,132,780	337,833,040	11,261,101	62 56	124 48
December.	8,979,975		225,622,960	199,921,480	434,524,415	14,016,917	77.87	154 95
Totals and average	47,679,735	712,270,201	2,163,383,440	1,570,905,160	4,494,238,536	12,313,804	68.41	136 04

SCHEDULE SHOWING THE TOTAL AND AVERAGE QUANTITY OF WATER PUMPED EACH YEAR SINCE THE BEGINNING OF THE WORKS.

Years.	Gallons Distributed.				Per cent. of increase.
	Per year.	Per day.	Each inhabitant per day.	Each consumer per day.	
1857	127,262,265	348,661	7.75	110.68	....
1858	142,155,431	398,467	8.37	93.44	11.70
1859	198,284,090	513,107	11.31	91.27	39.45
1860	260,220,354	710,984	14.11	101.57	31.87
1861	322,175,022	881,599	16.32	114.50	23.81
1862	369,673,092	1,012,791	19.47	120.57	14.74
1863	420,790,875	1,152,875	20.97	117.54	12.88
1864	476,114,225	1,300,858	21.68	123.89	12.14
1865	517,261,005	1,417,153	21.80	122.70	8.64
1866	587,372,220	1,609,238	22.35	124.26	13.55
1867	696,369,375	1,907,861	23.85	115.98	18.55
1868	768,786,975	2,106,265	24.77	116.08	10.40
1869	898,936,125	2,462,839	27.36	120.20	16.92
1870	1,126,228,500	3,085,558	30.86	113.20	25.28
1871	1,367,621,100	3,746,907	35.68	124.90	21.45
1872	1,686,370,895	4,607,571	40.07	131.64	23.67
1873	1,869,768,835	5,095,230	43.06	137.71	10.85
1874	2,050,252,910	5,625,150	45.36	141.10	9.65
1875	2,216,775,816	6,073,358	44.00	136.65	8.12
1876	2,399,225,403	6,573,220	49.22	131.28	8.23
1877	2,820,326,074	7,726,920	55.91	142.24	17.55
1878	2,892,946,823	7,925,882	51.13	135.05	2.57
1879	3,455,271,981	9,466,498	62.69	145.61	19.48
1880	3,725,683,021	10,179,461	65.25	145.23	7.82
1881	4,847,209,363	13,280,025	76.76	162.31	30.10
1882	4,494,538,536	12,313,804	68.41	136.04	7.27

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ANNUAL REPORT

OF THE

TRUSTEES

OF THE

WATER WORKS

OF THE

CITY OF CLEVELAND,

1883

TWENTY-EIGHTH

ANNUAL REPORT

OF THE

BOARD OF

TRUSTEES OF WATER WORKS

TO THE

CITY COUNCIL,

TOGETHER WITH THE

REPORTS OF THE OFFICERS OF THE BOARD.

For the Year 1883.

CLEVELAND, O.:
Home Publishing Co.
1884.

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TILDEN FOUNDATIONS.
1902

TRUSTEES' REPORT.

To the Honorable Mayor and City Council of Cleveland:

GENTLEMEN: The undersigned would respectfully submit this, the twenty-eighth annual report of the Trustees of Water Works, together with the reports of the Secretary, the Superintendent and Engineer, and the Engineer of Pumping Works.

The receipts for water for the year amount to $274,614.15, the expenses and repairs to $73,210.82, leaving the net earnings $201,403.33, being an increase in receipts over the previous year of $22,619.69, and of net earnings an increase of $15,101.90.

The expenditures for permanent improvements, including lands for Reservoir sites and high service pumping station were as follows:

Main pipes, 30 and 36 inch, including valves and labor laying same	$153,098 42
Distributing pipes, including valves, five hydrants, and labor laying same	131,440 95
Land for Fairmount Reservoir and pumping station and cost of appropriation	28,333 51
Land for High Service Reservoir	10,150 33
Contractors' estimates Fairmount Reservoir.	45,328 38
Contractors' estimates High Service Reservoir	10,781 53
Estimates for addition to boiler house	21,279 26
Estimates for new boilers and fittings	11,332 99
Water Meters and setting same	10,650 27
Other items of cost of permanent improvements	22,614 11
Total payments for lands and permanent improvements.	$445,009 75

Two hundred and fifty thousand dollars of City bonds for water works purposes were issued, and the proceeds used in part payment of the above expenditures, the balance being paid from the surplus earnings of the department. Further issue of bonds will be necessary to complete the work now under contract, and for main pipes connected with the distribution system of the high service district.

Contracts entered into and the estimated amounts to be expended under them are as follows:

Fairmount Reservoir, with McReynolds & Co., estimated amount...	$269,184 50
High Service Reservoir, with Messrs. Hall & Freeman, estimated amt.	120,291 06
New boiler house, with Messrs. Uhl & Kostering, estimated amount..	20,818 43
Three steel boilers, with the Globe Iron Works	14,985 00
Fittings by the pound and piece, Main pipe, 30 in. and 86 in., with Silas Merchant, estimated amount..........................	166,300 60
Pumping engine, Henry R. Worthington...............	84,500 00

The report of the Secretary furnishes information in detail of the financial condition of the department, and shows a very gratifying increase in revenue.

The report of the Superintendent and Engineer, and the Engineer in charge of Pumping Works show the condition of the works, and the progress of the new enlargement so fully that anything additional from us would only be repetition. The suggestion in both of these reports that the old Cornish engines be taken out and used for the High Service works, merits, and will receive from us, careful consideration. We will, with your co-operation, endeavor to complete the improvements now in progress, at the earliest date practicable, consistent with safety and the substantial construction demanded in work of this character.

We estimate the cost of the work to be done during the ensuing year as follows:

Contractors' estimates, Fairmount Reservoir	$200,000 00
" " Kinsman street Reservoir	110,000 00
" " new boilers	10,000 00
Main pipe under contract	60,000 00
" " to be laid south of Kinsman street	70.000 00
Distributing pipe, low service district	180,000 00
Sub-mains and distributing pipe in 18th ward	50,000 00
High Service Engine House and Engines	100,000 00
Total estimates for permanent improvements	$730,000 00
Add operating expenses and ordinary repairs	75,000 00
Total anticipated expenditures	$805,000 00
Deduct estimated receipts for water	290,000 00
Amount of bonds required	$515,000 00

Water is supplied to the different departments of the city free of charge, for use in public buildings, parks, cemeteries, etc., through 130 supply pipes and through 26 to hospitals and charitable institutions. 1501 fire hydrants and 70 fire cisterns are also supplied, besides the water used for flushing sewers and puddling streets and sewer trenches and sprinkling streets.

We desire to call your attention to the wasteful extravagance in the use of water by some of the charitable institutions now furnished with lake water, free of charge, under an act of the Legislature. While it is eminently proper that such institutions should be supplied with a liberal quantity of water per capita without charge, it is our experience that many of them habitually abuse the privilege. We know this to be a fact from the record of the meters we have caused to be placed on some of the pipes through which the supply is drawn.

One such institution, having an average of about four hundred inmates during the six months ending Oct 1st, 1883, used and wasted at the rate of 24.400 gallons per day, or more than 60 gallons per capita per day, just double the quantity necessary for all useful and sanitary purposes.

We would suggest that application be made to the Legislature to amend the act referred to, limiting such institutions to a given quantity per capita per day, and requiring them to pay the regular rates established for water for all excess. Also that the proper officer of all such institutions be required to file with the Secretary of Water Works, as often as may be required, a sworn statement of the number of resident inmates of such institution for the term for which water bills may be made.

Respectfully submitted,

WM H. LUTTON,
WALTER BLYTHE,
PERCY W. RICE.
} *Trustees of Water Works.*

Cleveland, March 6, 1884.

SECRETARY'S REPORT.

To the Board of Trustees of Water Works:

I hereby respectfully submit my report as Secretary, for the year 1883:

The receipts for water, including permits, less am't refunded, is	$274,614 15
The net amount of expenses and repairs is	73,210 82
Leaving the net earnings	$201,403 33

The comparative amounts with the previous year are:

Increase of receipts for water		$ 22,619 69
Increase of expenses and general repairs	$2,511 84	
Increase of lake crib repairs	5,005 95	7,517 79
Increase of net earnings		$ 15,101 90

The receipts and disbursements of cash for the year, including balance as shown by the books of the office, are:

RECEIPTS.

Cash in city treasury, January 1, 1883, as per report	$ 15,023 89
Cash in office January 1883, as per report	1,243 34
For water, from assessments, &c., less amount refunded	158,544 28
For water by meter measure " " "	110,453 92
For permits (in water rent account)	5,616 00
For par value of Water Works bonds sold	250,000 00
For premiums on $100,000 of same	1,120 00
For buildings on reservoir lands sold	1,291 00
For water meters	348 25
On office and general expense account	465 10
On general repairs account	218 34
On engine house expense account	27 90
On pipe extension account	5,269 06
	$549,621 03

DISBURSEMENTS.

For pipe extention	$ 280,608 43
For Fairmount reservoir lands	28,973 80
For Fairmount reservoir contractors' estimates ,&c	64,184 61
For Kinsman street reservoir lands	9,926 00
For Kinsman street reservoir contractors' estimates, &c	15,414 96
For payments on new boiler house	21,279 26
For payments on new boilers	11,582 90
For water meters, and setting the same	10,998 52
For interest on water works bonds	30,000 00
For office and general expenses	25,914 28
For expenses at engine house	36,196 80
For general repairs	5,479 40
For repairs at engine house	1,326 26
For repairs at lake crib	5,006 92
Cash in city treasury, subject to draft, January 9, 1884	2,160 86
Cash in office January 9, 1884	1,619 96
	$ 549,621 08

The disbursements include pay rolls and other claims of the month of December allowed by the Board of Trustees at their meeting, January 6, 1884, and the balance in the city treasury is the amount subject to draft after payment of the same.

The items and amount of receipts in the foregoing statement, and not included in water rent account and for proceeds of bonds sold, are from

1883.		
January.	Sandusky water works, one 8 in. sleeve	$ 3 00
	American Wire Co., 3 in. connection	74 77
	C. C. C. & I. R'y, 4 in. connection	91 75
	W. Body, elevator connection	78 56
	C. & P. R'y, 3 in. connection	101 14
	J. B. Perkins, 4 in. connection	90 64

	J. B. Perkins, 2 in. connection	25 64
	" " 3 in. connection	76 15
	" " 2 in. connection	29 22
	Valley Railway, 3 in. connection	88 88
	New York, Chicago & St. Louis R'y, repairing hydrant	7 92
	Lake Shore Foundry, scrap iron	258 08
February.	Marsh & Harwood, connection	70 81
	Northern Ohio Blanket Mills, 2 in. connection	12 44
	W. C. Scofield, 2 in. connection	80 83
	Halle, Skalle & Co., connection	134 46
	Halle & Co., connection	136 30
	American Lubricating Oil Co., 6 in. pipe in Hamlet street	308 78
	F. & H. Born, for connection	80 27
	C. C. C. & I. R'y, for 4 in. connection	56 35
	S. Brainard's Sons, elevator connection	82 52
	Silas Merchant, laying pipe at foundry	871 44
March.	S. H. & E. Block, elevator connection	81 50
	J. B. Perkins, elevator connection	95 63
	Cleveland Transportation Co., use of dock	40 00
April	V. C. Taylor, office rent	100 00
	Geo. S. Paine, Auditor's warrant, No. 911, returned	55
	Chas. Swabka, house rent	5 00
May.	Chas. J. Broker, one ¾ in. water meter	28 00
	Chas. Swabka, house rent	5 00
June.	R. Doty, old barrels sold	25 90
	W. Ward, 2 in. connection	15 80
	Cleveland Woolen Mills, 3 in. connection	42 85
	Chas. Swabka, house rent	5 00
	C. H. Strong, 87 lbs. scrap Iron	87
	R. Doty, for old stove sold	2 00
July.	V. C. Taylor, office rent	100 00
	Clerk Board of City Improvements, old dwellings sold	745 00
	Standard Oil Co., water meters	103 25
	N. Y. P. & O. R. R., 4 in. connection	73 90
	Clerk Board of City Improvements, old dwellings sold	532 00
	Chas. Swabka, house rent	5 00
	Forest City Varnish Co., moving hydrant	37 87

	Cleveland Rubber Works, for connection	163 98
	Lake Erie Iron Co., for connection	69 59
August.	J. Krause & Co., for connection	140 28
	Clerk Board City Improvements, for old dwellings sold	14 00
	Geo. S. Paine, for connection	22 33
	Upson Nut Co., for laying Pipe	392 87
	Grace Church, for connection	24 14
	Co-Operative Stove Co., for elevator connection	96 31
	H. Goldstein, for old rubber hose sold	2 40
	C. C. Dewstoe, for 4 in. connection	156 52
	A. Jones, for 4 in. connection	75 97
	Smith & Connors, for connection	61 95
Septemb'r.	Monroe Bros. & Co., for connection	82 25
	C. C. C. & I. Railway, repairing leak	16 25
October.	Chas. Kress, water meter	28 00
	V. C. Taylor, office rent	100 00
	H. Tiedeman, for water meters	134 00
	Smith & Connors, connection	18 50
	Geo. H. Kelley, valve box	4 39
	C. C. Schellentrager, on ac't ¾ water meter	20 00
	John Dort, water meter	28 00
	Strong, Cobb & Co., lowering pipe Long st	88 91
Novemb'r.	Everson & Delamater, repairing water pipe	36 64
	C. C. Schellentrager, on ac't water meter	7 00
	Lake Erie Iron Co., fire hydrant	25 00
Decemb'r.	West Cleveland water works, for 4 in. pipe	15 22
	C. E. Gehring, 2 in. connection	15 67
	Henry Wick, enlarging connection	58 32
	Standard Oil Co., 4 in. connection	82 72
	C. W. Scofield, 4 in. connection	76 49
	V. C. Taylor, office rent	100 00
	Strong, Cobb & Co., lowering pipe	45 92
	Cleveland City Forge and Iron Co., 2 in. connection	29 28
	Cleveland City Forge and Iron Co., 4 in. connection	165 11
	C. C. Dewstoe, connection	17 07
	Superior Street Railway, changing location valve box	30 00
	Smith & Connors, 3 in. connection	64 14

A Putt, 2 in. connection	38 70
Lake Shore Foundry, scrap iron	902 53
Auditor's warrant cancelled	5 10
	$7,619 65

LEDGER BALANCE JANUARY, 1884.

Construction	$3,358,841 56	
Interest	140,802 09	
Fairmount reservoir	123,808 41	
Kinsman reservoir	25,340 95	
Water meter acc't	38,688 86	
Boiler house extension	21,279 26	
New boilers	11,582 99	
Cash	1,619 95	
City Treasurer	2,160 86	
Water rent		$1,600,997 67
City of Cleveland		48,071 26
Bonded debt		1.150,000 00
Bonds redeemed		925,000 00
	$3,724,068 93	$3,724,068 93

The yearly receipts for water rent and the expenditures for running expenses and repairs from the introduction of lake water into the city until the present time, also the earnings after deducting such expenditures are as follows:

YEARS.	Receipts for Water.	Running Expenses.	Repairs.	Receipts, Less Expenses and Repairs
1856 to 1859	$34,528 78	$29,845 49	$2,996 08	$1,687 16
1860	16,793 60	7,683 80	1,734 38	7,375 42
1861	17,097 85	7,768 36	1,350 84	7,978 65
1862	22,730 53	8,086 19	1,291 29	13,353 05
1863	23,421 30	10,011 96	835 54	12,573 80
1864	33,389 49	13,573 26	1,953 49	17,862 74
1865	40,888 01	17,346 56	1,382 21	22,159 24
1866	45,363 70	14,277 13	8,818 77	22,267 80
1867	51,863 45	14,246 06	3,685 79	33,930 60
1868	57,297 98	17,304 32	3,653 43	36,340 23
1869	62,869 72	18,880 13	3,299 56	40,690 03
1870	70,411 18	19,725 24	9,823 99	40,861 95
1871	80,487 44	24,382 16	10,155 33	45,949 95
1872	90,243 96	26,951 65	6,953 49	56,338 82
1873	108,431 00	38,218 30	3,673 07	66,539 63
1874	116,433 08	48,951 79	9,515 99	57,965 30
1875*	114,602 13	57,830 17	11,566 26	45,205 70
1876	140,935 87	51,481 59	15,966 86	73,487 42
1877	152,794 68	50,571 46	20,673 36	81,549 86
1878	160,125 70	47,183 44	22,453 91	90,488 35
1879	182,173 33	44,616 59	11,182 61	126,374 13
1880	202,377 92	47,618 76	8,296 13	146,463 03
1881	236,221 87	56,430 19	8,586 07	171,205 61
1882	251,994 46	57,857 47	7,835 58	186,301 41
1883	274,614 15	61,617 58	11,593 24	201,403 33

*For ten months.

BONDS AND INTEREST.

City bonds for water works purposes have been issued during the year amounting to two hundred and fifty thousand dollars, including fifty thousand dollars issued January, 1884.

One hundred thousand dollars of the same are four per cent. bonds and were sold with other city bonds at a premium of eleven hundred and twenty dollars.

The balance, one hundred and fifty thousand dollars are six per cent. bonds and were taken at par value and accrued interest by the Sinking Fund Commissioners of the city.

BONDS OUTSTANDING.

Four hundred thousand dollars 7 per cent. bonds, due in -	1892
Two hundred thousand dollars 7 per cent. bonds, due in - -	1893
Two hundred thousand dollars 6 per cent. bonds, due in -	1895
One hundred and fifty thousand dollars 6 per cent. bonds, due in	1897
One hundred thousand dollars 3 65-100 per cent. bonds, due in	1902
One hundred thousand dollars 4 per cent. bonds, due in -	1903

The annual interest on bonds now outstanding amounts to seventy thousand six hundred and fifty dollars.

Of the interest due in 1883 on water works bonds, thirty-nine thousand six hundred and fifty dollars was paid from the interest fund of the city and twenty thousand dollars from the water works fund.

It seems proper to note that in addition to water furnished for private use for which payment is made, a large amount is furnished for public use and to charitable institutions without charge, and that the cost of furnishing water for public use and such institutions is entirely at the expense of the paying water consumers unless a tax be levied upon the taxable property of the city for the payment of the interest on the bonded debt for water works purposes.

H. C. HAWKINS,
Secretary.

CLEVELAND, March 6, 1884.

SUPERINTENDENT'S REPORT.

To the Board of Trustees of Water Works:

GENTLEMEN—I herewith submit thet wenty-eighth annual report upon the condition of the Water Works:

LAKE CRIB.

During the early part of the summer a number of the planks forming the outer sheathing of the crib were torn off during a heavy storm.

The timbers forming the walls of the structure were found to be considerably decayed in many places New timbers were inserted in the weakest places, backed by upright posts, and new plank placed on the outside; iron straps were then placed outside of the planking and securely fastened by bolts passing through the timber wall.

The walls were further strengthened by placing additional upright timbers and braces on the inside.

The wrought iron band that had been put round the crib after its damage by the storm of September, 1878, and had become loosened by the removal of the timber blocking from under it during storms, was taken off, repaired and replaced directly on the surface of the walls, the top being at about the ordinary water line. It will now serve as a protection against the action of floating ice, instead of being, as it has been heretofore, a source of weakness and cause of anxiety.

The work done upon this band was of a very tedious and difficult character, and therefore expensive, but is permanent in its nature, and forms a part of the sub-structure of the building. The other work mentioned is temporary and will be removed when the superstructure is rebuilt.

I renew my recommendation, made in former reports, that the superstructure be rebuilt at an early day. The weakness developed during the past season is evidence that the work cannot be longer delayed, with safety.

TUNNEL.

The flow of water through the tunnel has been uninterrupted during the year, and the quality has been, with few exceptions, all that could be desired.

BUILDINGS.

The extension of the boiler house, including a new chimney and boiler foundations, on the north lot, has been completed as originally designed. The total length of the structure is $165\frac{8}{12}$ feet with a depth of $48\frac{6}{12}$ feet.

The machine shop and blacksmith shop attached to the boiler house are respectively of the following dimensions, namely: $52\frac{9}{12}$ by $17\frac{2}{12}$ feet, and $26\frac{3}{12}$ by $18\frac{6}{12}$ feet, affording ample room for any work that can be done to advantage by the regular force employed at the works.

The new extension will contain three boilers of the marine type, each ten feet in diameter and twenty feet long, and three Cornish boilers each six by thirty feet. These boilers and their settings will be similar to those now in use.

The battlements surmounting the walls of the south pumping house have been in a dangerous condition for some time. By your order they are being removed and replaced by stone coping. The work has been delayed by the inclement weather following its commencement.

MACHINERY.

As will be seen by the report of Mr. Doty, Engineer in charge of Pumping Works, all the machinery and boilers are in good order.

The repairs made to No. 1, Worthington engine, leave it in as good condition as it was before the accident, and the plunger rods are even better than the original ones.

I agree with Mr. Doty in his suggestions relative to the removal of the Cornish engines, and using them at the high service works.

With a few repairs these engines are good for fifty years service. My reasons for their removal and their use for the high service works will be stated more at length before closing.

RESERVOIR.

The reservoir was thoroughly cleaned during the month of July. Scarcely any sediment had been deposited since the previous year. The object in cleaning it was to remove the growth of aquatic vegetation that had made its appearance a few feet below the surface of the water, and thus prevent the recurrence of the disagreeable taste and odor that appeared about the same date during the previous year. The re-appearance of the trouble was thus prevented.

MAIN PIPES.

The 36 inch main, for conveying water to the low service reservoir at Fairmount street, through Quincy street, has been laid from Willson avenue east to a point 390 feet west of Bolton avenue, a distance of 6,990 feet, at a cost of $9.43 per foot, including all labor and materials. 140 feet of extra heavy 36 inch inlet pipe has been laid under the west embankment of Fairmount reservoir, into the north basin.

The 30 inch main for supplying water to the high service district has been laid through Woodland Hills avenue south, from a point 93 feet south of Quincy street, a distance of 2,370 feet, at a cost of $7.08 per foot, including every item of expense; 277 feet of extra heavy 30 inch pipe for supplying water to the high service pumps has been laid under the embankments of the low service reservoir. Through these pipes water can be drawn from either basin.

Provision has also been made for taking water for the high service pumps directly from the 36 inch inlet main outside of low service reservoir.

Contracts were made in March last, for all of the 36 inch pipe and special castings necessary to complete the line from

Willson avenue to the lower reservoir, and for the 30 inch pumping and distributing main, from the high service pumping works, through Woodland Hills avenue and Kinsman street to the high service reservoir. These pipes and specials will all be delivered by April next.

Proposals should be invited at once, for furnishing such portion of the main pipes for the high service district as will be necessary for supplying the system of sub-mains that must be laid and extended as fast as the demand for water may require.

Main pipes should be laid in Woodland Hills avenue south from Kinsman street, as follows: From Kinsman street to Union street, 3,100 feet of 30 inch, with 20 inch branch in Union street west; from Union street to Way street, 2,724 feet of 24 inch, with 20 inch branch in Way street west; from Way street to Harvard street, 2,590 feet of 20 inch, with 16 inch branch in Harvard street west; from Harvard street to Miles street, 1,330 feet of 16 inch, with 16 inch branch in Miles street west.

These pipes, with the branches proposed, when laid, will, with branches already provided for in that section of the main north of Kinsman street, provide a means of supplying any portion of the territory within the high service district, through sub-mains extending from the different branches. Some of these sub-mains, particularly such as will pass through the iron manufacturing districts will undoubtedly be called for at once, and provision should be made for laying such of them as may seem most necessary for sanitary purposes, fire protection and business interests.

Your attention is again called to the necessity of another main, to be laid from the new pumping engine south, for the supply of that section of the city west of the Cuyahoga river. The streets through which it would be laid, with the length and different sizes necessary, are more particularly described in my Annual Report for the year 1881, to which you are respectfully referred.

DISTRIBUTING PIPES.

The increase in distributing pipe during the year was, for all sizes, ranging from 3 inches to 12 inches in diameter, 21 miles, 832 feet: in main pipe, 1 mile, 4,497 feet, making the total length of pipe added to the distributing system 23 miles, 49 feet. This added to the pipe laid previous to 1883, makes a total of 175 miles 4,951 feet, of which 15 miles, 2,236 feet is main pipe, and 160 miles 2,715 feet is for street distribution.

During the year, 1,932 feet of pipe was relaid, and 5 miles 1,256 feet, with the connections attached thereto, numbering 688, and measuring 3 miles 519 feet, was lowered to an average depth of six feet.

The increase in the length of pipe has been just 100 miles in ten years. During the same period, 10,012 service connections have been made.

STOP GATES.

The number of new stop gates added during the year was 424. Of these three were in the new 36 inch main. Twenty-one gates were taken out and replaced by larger ones.

The total number of stop gates now in use, of all sizes, is 3,164; of these 82 are in main pipe lines.

FIRE HYDRANTS.

The number of fire hydrants set during the year was 237, and 17 were changed from 3 inch to 4 inch water way.

The total number set at the close of the year was 1,501.

The accompanying tables give all the details necessary to a full understanding of the character and extent of the work done during the year.

SERVICE PIPES.

For the year ending December 31st, 1883, the number of new service pipes attached to the supply mains was 1872, being the largest number of connections made during any year since the introduction of lake water. These, added to the connections made prior to 1883, make a total of 16,364. Of these 664 are turned off, 815 are not extended beyond the curb line, and 44 have been abandoned and the openings plugged, leaving the number in actual use on the last day of the year 14,841, being an increase of service pipes in use over the year 1882 of 1,918.

CONNECTIONS MADE IN 1883.

⅝	inch	1803
¾	"	25
1	"	6
1¼	"	5
1½	"	1
2	"	15
2½	"	1
3	"	6
4	"	9
6	"	1
	Total in 1883	1872

TOTAL CONNECTIONS.

⅝	inch		15440
¾	"		452
1	"		141
1¼	"		14
1½	"		33
2	"		132
2½	"		3
3	"		61
4	"		86
6	"		2
	Total of all sizes		16,364
Turned off for non-payment of rent		664	
Not extended beyond curb line		815	
Abandoned and plugged		44—	1,523
	Number in use December 31st		14,841

WATER METERS.

The number of new meters set during the year was 147; hydraulic elevators connected 3; registering water motors 2.

The total number of meters now in use is 849; of hydraulic elevators 60; water motors 4.

The name, size and number of each size and make of meters, is as follows:

KIND OF METER.	¾ in.	1 in.	1½ in.	2 in.	3 in.	4 in.	Total.
Worthington Piston	405	204	75	83	46	14	827
Ball & Fitts Union Piston	1	.....	.....	.....	.....	.....	1
" " Rotary	2	1	.....	1	1	.....	5
Crown Rotary	5	10	.....	.....	1	.....	16
	413	215	75	84	48	14	849
Hydraulic Elevators with registers attached							6
Water Motors " " "							4
Total							913

The quantity of water measured during the year was 1,071,078,400 gallons, an increase of 143,738,150 gallons over the year 1882. The average quantity measured per day was 2,934,461 gallons.

DISTRIBUTION.

The total number of gallons of water pumped during the year 1883 was 5,187,432,657, an increase of 692,894,121 gallons over the previous year. The daily average consumption was 14,212,144, or 1,898,340 gallons more than the daily average for 1882.

The rate of increase for the year was 15.41 per cent. The cost of pumping each million gallons 100 feet high was 4.56.

FAIRMOUNT RESERVOIR.

The contract for this work was let in June to Messrs. William McReynolds, John Gawne, John Thomas Gawne, and William James Gawne, for the sum of $269,184.50. This sum includes the cost of all embankments, excavations, puddle lining, ballasting, concrete, paving, drainage conduit, inlet and outlet chambers, stone stairs, soiling and seeding outer slopes, and all work incidental to that above named, on the basis of the quantities estimated and stated in the specification, but does not include the inlet and outlet pipes and gates, bridges, fencing and railing. The pipes and gates are furnished by this department and are to be laid by the experienced pipe layers regularly employed at that kind of work. The contract for the bridges, fencing and railing need not be let until the work is further advanced.

The earthwork in the outer embankments is nearly completed.

The work accomplished under the contract at the end of the year, is as follows: Earth excavation 169,336 cubic yds.; hard shale excavation 17,521 cubic yds.; clay puddle 687 cubic yds. at a cost of $53,327.00, including fifteen per cent retained upon the work done.

The two lines of 30 inch outlet pipes for supplying water to the high service pumps, and one of the lines of 36 inch pipe for the low service district have been laid under the west embankment. These pipes are respectively 1¾ inches, and 2 inches thick, and are laid on brick piers reaching down to rock. Two rings of brick masonry, laid in hydraulic cement, 8 inches thick and 20 inches lengthwise of the pipe, are built over each length of pipe; the trenches were refilled with puddled clay, thoroughly tamped. They are all laid below the bottom line of the clay puddle lining of the basin. The cost of this work was $9,692.68.

HIGH SERVICE RESERVOIR.

Proposals were received for building the high service reservoir late in October, and the contract awarded to Messrs. Freeman and Hall for the sum of $120,814, they being the lowest bidders. The work having been commenced so late in the year, it was not expected that much progress would be made before winter set in, but the season proved to be favorable and a large amount of work was accomplished.

The soil has been removed from the entire surface, not only of the reservoir ground but of the land from which the material for the embankments is to be taken.

The base of the embankments and the bottom of the basin have been brought up to sub-grade line over nearly all the surface. The quantity of material removed was 34,869 cubic yards of excavation, and 600 cubic yards of gravel has been delivered on the ground.

The total cost of the work to the end of the year, including 15 per cent. retained, is $12,684.

HIGH SERVICE PUMPS.

The different parts of the work of enlargement and extension are nearly all under contract, and some of them are well advanced toward completion. There remains only the high service pumping works and the extension of the high service main pipe south of Kinsman street, to be provided for. For high service pumping engines I would suggest the consideration of the question of removing the old Cornish engines from their present location, and using them for these works.

I ask of you a careful investigation of this proposition for the following reasons:

First. This type of engine is adapted only to a uniform service, that is, to pumping against a nearly uniform head, and does not work well while pumping into a system of pipes into which other engines are delivering water at the same time.

Second. They are best adapted to pumping through a stand-pipe and main leading to a reservoir.

Third. In their present location they deliver water through a main pipe not large enough to allow the delivery of the quantity of water they are capable of pumping, therefore their full capacity cannot be used unless expensive alterations are made, including the laying of a larger pumping main and the building of a new stand-pipe. In times of low water in the lake, and when two or more of the other engines are running, the water fails to reach the wells from which they take suction, and at such times they must stand idle.

Fourth. Their combined capacity, as they now stand, is only seven and three-fourth million gallons in twenty four hours, while, if they could deliver water into a main pipe of suitable size, through a stand-pipe of proper height, they could easily pump ten million gallons in the same time.

Fifth. The room in which they stand is of ample size to accommodate an engine of modern design, having a capacity nearly four times greater than that of both these engines.

The fact that all the water required by the city must first be pumped from the lower works is a good argument in favor of economizing space at that station, to the end that the time for erecting new buildings may be put off as long as possible.

Sixth. They are admirably adapted to the work that would be required of them at the high service station; the conditions would be those under which they would work to the best advantage.

Seventh. The lot secured for this station is underlaid with rock, at a depth of only a few feet below the surface, thus affording a secure and reliable foundation at the lowest cost for this class of engine.

Eighth. The cost of taking them down, putting them in thorough repair, removing them to their new location, and erecting them on new foundations, would be insignificant compared to the gain in space for increased capacity at the old works, their adaptation to the work that would be required of them, and the increase in capacity that would be given them by making the change.

While their beauty of finish and proportion may not in itself have any weight as a reason for making the change, yet when considered in connection with the other reasons given for their removal, should have its influence. When these engines were built, they were acknowledged to be the finest examples of their type in America, the builders, without solicitation, having generously donated several thousand dollars in extra finish. In their present location comparatively few persons ever see them, the approaches and surroundings not being of a nature to attract visitors. At the high service station the surroundings are different, and their beauty would be seen and appreciated.

Respectfully submitted.

JOHN WHITELAW,

Supt. and Engineer.

CLEVELAND, Feb. 29, 1884.

REPORT OF THE
ENGINEER IN CHARGE
OF THE
PUMPING WORKS.

To the Trustees of Cleveland Water Works:

GENTLEMEN: The following report of the Engineer in charge of the pumping department of the City Water Works is respectfully submitted.

CORNISH ENGINES.

No expense has been necessary upon these Engines, since my last report, and very little pumping has been done by them. They remain in the same condition as when last reported upon. Under head of recommendations I have suggested a plan by which these engines can again be made available, with your approval.

HENDERSON ENGINES.

The service of these engines has been quite satisfactory, since last reported upon, and no considerable expense has been necessary to keep them in repair. The alterations in the north engine piston, referred to in my last report, have continued to give good satisfaction, and I am still of the opinion that the same alterations in the south piston, should be made at the earliest possible moment, unless more radical measures should be adopted by your Honorable Body. While these engines remain in their present position, we shall always be deficient in boiler capacity in the south building.

No. 1 Worthington Engine.

Sunday evening, Oct. 14th, at 8:45 o'clock, the plunger rod in the north pump, broke in the backing key slot, without giving us the least warning. Upon examination it was found that it had been fractured for some time previous. We had reason to apprehend serious results from this accident, as the whole power of the engine was expended upon itself. A careful search, however, revealed only a fractured cylinder lug, that receives the tie rod from the pump, and the starting of the nuts on the internal high pressure cylinder head. A new steel rod was immediately provided, and the fractured lug secured by means of a heavy wrought iron strap, which relieves it from all strain and makes the part as firm as before the accident. The repairs were completed Oct. 26th, and the engine was immediately started, and ran until the 5th day of November, when the south side of the same engine met with a similar accident, excepting, instead of the plunger rod breaking, the back or socket casting, connecting the plunger rod to the plunger, broke in three pieces, the result of which was about the same as in the first instance. A defect having been discovered in this plunger rod, it was thought best to get a new one and a much heavier socket casting. These were provided and the repairs completed November 18th. Since that time the engine has performed her regular work in the [illegible] manner and shows no signs of ever having met with an accident.

[illegible] cause for these two accidents. [illegible] the early [illegible] in the [illegible] from each pump, [illegible] not happen [illegible] but a care- [illegible] no damage in these [illegible] cause for these accidents [illegible] speculation. However, if the drawing out of these two suction valves was the primary cause, we have nothing to fear from a repetition of these accidents to our No. 2 Worthington engine, as I inserted a clause in the specifications for those engines, requiring the valve seats to be secured by bolts and nuts in place of the lead caulking, as in the No. 1 engines.

No. 2 WORTHINGTON ENGINE.

The performance of this engine has been so perfectly satisfactory that I need only to refer you to the schedule, when you will observe that she leads the list in point of economy and amount of water pumped.

ENGINE REPAIRS.

No repairs have been necessary upon any of the engines at the Works, aside from what was done by our regular force, the expense of which will appear in the Secretary's Report of Pumping Works' running expenses, except the accidents to No. 1, which amounted to $352.91.

BOILERS.

Three new boilers of the same size and general plan as our last three, placed in the north side boiler house in 1881, have been constructed and delivered, for the new Worthington engine now under contract. With this exception our boiler capacity remains the same as last year. Slight repairs only have been necessary, and the boilers are in good order at this time.

RECOMMENDATIONS.

In view of the fact that, during the coming year, engines must be provided to supply the new high service reservoir, I would recommend that the Cornish engines be removed from their present location in the old north side building and erected in a suitable building at the new low service reservoir on Woodland Hills av. This suggestion implies also the removal of the six Cornish boilers now operated in connection with these engines. There are several important reasons for making these recommendations. A few of the most apparent, will, I think, satisfy you that they are worthy of your consideration. The Cornish engines cannot be successfully operated through the same main with any other engine, consequently, if allowed to remain in their present location, the expense of a new main from the old works to the new low service reservoir must be met. The old tower must be taken down and a new one provided, and the suction pipes extended to the new pump wells outside the building. The expense of these changes and necessities will involve a much larger outlay than would be necessary to take the engines down and erect them at the new reservoir. The valuable space they now occupy, could then be used to erect two engines of much greater capacity, and the department would not be obliged to enlarge the present building at the old works for many years.

The increasing necessity for power tools, as lathes, planes, drills, etc., for our vacant machine shop room, seems to warrant me in calling your attention to the matter at this time. It has been our policy to do all the repairs possible at the Works and we now have eight pumps, large and small, and the pumping [illegible] another. These, in connection with those [illegible] must necessarily require considerable repairs. It is obvious, therefore, that with a well selected stock of tools at hand, much expense and delay can be saved to the department.

Schedule showing gallons of water pumped and coal consumed in pumping, percentage of coal consumed and water pumped by each engine, contract price of coal, coal consumed and cost of coal for raising one million gallons into reservoir:

ENGINES.	Gallons of Water Pumped by Different Engines.	Pounds of Coal Consumed by Different Engines.	Per cent. of Water Pumped by Different Engines.	Per cent. of Coal Consumed by Different Engines.	Per cent of Coal Consumed by Different Engines Pumping 1,000,000 Gallons into Reservoir.	Contract Price of Coal per Ton.	Cost of Pumping 1,000,000 Gallons of Water into Reservoir.	YEAR.
No. 1 Worthington	2,256,244,480	6,761,100	43.50	41.24	29.96	$1 65	$2 47	1883
No. 2 Worthington	2,437,972,080	7,150,200	47.00	43.67	29.37	"	2 42	1883
Henderson	465,809,407	2,389,400	08.98	14.57	51.28	"	4 02	1883
Cornish	27,345,990	84,900	00.52	00.52	31.01	"	2 59	1883

Tables giving the amount of work done by the different engines during the past year, also showing all the work done since the Works were started, are herewith appended, to which your attention is invited.

Respectfully submitted.

R. DOTY.
Engineer in Charge.

CLEVELAND, Feb. 24, 1884.

TABULAR STATEMENTS.

The following pages contain tabular statements showing the work of engines, distribution of water, extension and laying of pipes, location and number of stopgates and hydrants set, abstract of expenditures, &c.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Totals.	Remarks.
	36 in.	Fairmount reservoir	Under embankment of the North Basin	140		
North	36 in.	Quincy	From E. L. Willson avenue to 380 ft. W. of Bolton avenue	6,980	7,120	
	30 in.	Fairmount reservoir	Under embankment of the North Basin	141		
	30 in.	Fairmount reservoir	Under embankment of the South Basin	136		
East	30 in.	Woodland Hills avenue	From 93 ft. S. of Quincy street to 426 ft. S. of N. L. North Woodland avenue	2,370	2,647	
North	12 in.	Division.	Between 30 in. and 12 in. pipes 25 ft. east of W. W. property	14		
North	12 in.	Division.	From 18 ft. W. of E. L. W. W. property, east	83		
East	12 in.	Giddings ave	From 12 feet N. of N. L. Quincy street, south	88	185	
West	10 in.	Fairmount.	From 9 feet S. of Euclid ave., south	10	10	
East	8 in.	Ansel ave.	From T in Doan street, north	238		
East	8 in.	Ansel ave.	From T in Republic street, north	696		

[illegible] EXTENSION OF WATER PIPE IN 188[illegible].—Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Totals.	Remarks.
[illegible]	[illegible]	[illegible]	[illegible] street to connect 6 inch and 4 inch pipe	[illegible]		
[illegible]	[illegible]	[illegible]	From pipe in Quincy street, north to connect	[illegible]		
[illegible]	[illegible]	[illegible]	Pipe in [illegible] to 90 feet east of Walbridge	[illegible]		
[illegible]	[illegible]	[illegible]	Pipe in [illegible] to pipe in [illegible] ave	[illegible]		
[illegible]	[illegible]	[illegible]	Pipe in [illegible] ave. to 12 feet N. of Garden	1,[illegible]		
[illegible]	[illegible]	[illegible]	Pipe in Garden street to 12 ft. N. of Garden	[illegible]		6 to 8 iron relaid
[illegible]	[illegible]	[illegible]	From [illegible] to 76 ft. N. of [illegible]	140		4 to 6 cem. relaid
[illegible]	[illegible]	[illegible]	From 1411 ft. N. of Euclid avenue to pipe in Ansel avenue	1,[illegible]		
[illegible]	[illegible]	[illegible]	From 144 ft. N. of Woodland avenue to [illegible] ft. N. of [illegible] street	1,871		
[illegible]	[illegible]	[illegible]	From 811 ft. E. of Willson avenue to 100 ft. E. of New street	400		
[illegible]	6 in.	[illegible] street	Pipe in [illegible] avenue to pipe in [illegible] avenue	700		
South	8 in.	[illegible] street	P. L. South [illegible] avenue east, to connect pipes	402		
West	8 in.	[illegible] avenue	Pipe in Quincy street north	87		6 to 8 iron relaid
East	8 in.	[illegible] avenue	Pipe in Lawn street, north	240		
North	8 in.	Lake street.	Pipe in Lawrence street, east	[illegible]		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883. Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Total	Remarks.
South.	8 in.	Orange street	Pipe in Case avenue to 520 ft. W. of Forest street	1,660		
East	8 in.	Oxford street	Pipe in St. Clair street, north to near L. S. & M. S. R'y	1,601		
East	8 in.	Oliver street	Pipe in Euclid avenue to N. L. Euclid avenue	44		
North.	8 in.	Payne avenue	T in Clifton street to W. L. Case avenue	296		
North.	8 in.	Payne avenue	Pipe in Perry street to W. L. Perry street	40		
North.	8 in.	Quincy street	Between 12 in. and 8 in. pipes at Giddings avenue	18		
South.	8 in.	Quincy street	Pipe in Madison avenue to pipe in Bolton avenue	2,412		
South.	8 in.	Rockwell street	From 8 in to 4 in. T at W. side Public Square, west	156		
North.	8 in.	Rockwell street	Pipe in Ontario street, west to 8 in. to 4 in. T at west side Public Square	267		4 to 8 iron relaid
South.	8 in.	St. Clair street	Pipe in Willson avenue to W. L. Beeker avenue	3,870		
West	8 in.	Wood street	8 in. pipe in Superior street to N. L. Superior street	39		4 to 8 iron relaid
East.	8 in.	Wade Park	N. L. Euclid avenue, north	1,642		
East	8 in.	Waverly avenue	S. L. Franklin avenue to 82 ft. S. of Lawn street	2,251	33,928	
South.	6 in.	Apple	Pipe in Orchard street to E. L. Harbor street	508		
East	6 in.	Arlington	T in Cedar avenue to S. L. Cedar avenue	24		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1863.—Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
East	4 in	Armitage..	T in St. Clair street, north, to angle of street....... ..	1,229		
West	4 in	Abram	T in Clark avenue to 14 ft. south of Clark avenue..	41		
East	4 in	Baker street	T in White avenue, north	601		
South	4 in	Barkwill	T in Broadway to T in Petrie street	1,486		
South	4 in.	Bayne street	T in Waverly street 12 ft. W. of E. L. Gordon avenue..	1,069		
East	4 in	Beach street	Pipe in Scovill avenue to N. L. Scovill avenue	85		
East	4 in	Birch street	S. L. Lorain street, south	496		
West	4 in	Birch street.	N. L. Lorain street to S. L. Franklin avenue	2,367		
South	4 in	Bolivar street	Valve at Prospect street to 6 ft. E. of Erie street.......	968		4 in. cement, 6 in. iron relaid.
West	4 in	Bond street	4 inch pipe in Superior street to S. L. Superior street ..	92		
West	6 in.	Brenton street	Pipe in Cedar avenue to 152 ft. S. of Cedar avenue	178		
South.	6 in.	Burwell street	Pipe in Forest street to W. L. Arch street......	442		
South	6 in.	Branch	Pipe in Scranton to pipe in Jennings avenue............	1,180		
East	6 in.	Catawba ...	T in Croton to 148 feet S. of Rock street..................	328		
West	6 in.	Cutler street	T in Euclid to S. L. Euclid.........................	47		
South.	6 in.	Castle ave.	Pipe in Scranton avenue to 12 ft. W. of E. L. Abram street	749		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883.—Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
South.	6 in.	Cedar avenue.	Valve at Willson avenue to T in Arlington street	407		
South.	6 in.	Clark avenue.	Pipe in Jennings avenue to 12 ft. E of W. L. Merchant avenue	648		
North.	6 in.	Creighton street	E. L. Perry street to pipe in Chapel street	586		
East.	6 in.	Central Way	Valve at N. L. Jefferson street to 22 ft. S. of Scotham street	744		
East.	6 in.	Clara	Pipe in White avenue, north	618		
South.	6 in.	Dille street	E. L. Broadway to pipe in Warren street	581		
North.	6 in.	Division street	W. L. Pearl street to pipe in Hanover street	636		
North.	6 in.	Davis Court.	Pipe in Sawtell avenue, west	460		
East.	6 in.	Douse street	Pipe in Broadway, north	1,137		
East.	6 in.	Dana street	Pipe in St. Clair street to T in Superior street	2,021		
South.	6 in.	Elm street	Hydrant at Winslow street to hydrant at Washington street	896		
East	6 in.	East Madison ave	138 ft. N. of Hough avenue to 87 ft. N. of Gould street	802		
East	6 in.	Florence street	Pipe in Cypress street to N. L. Woodland avenue	621		
South.	6 in.	Franklin avenue	86 ft. W. of Columbus street to 273 ft. W. of Hurd street	755		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883.—Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
South	6 in.	First alley N. of the infirmary	Pipe in Pearl street to pipe in Scranton avenue	490		
South	6 in.	Fifth avenue	E. L. Willson avenue to pipe in Second avenue	1,188		Southern's pipe.
South	6 in.	Fourth avenue	E. L. Willson avenue to pipe in Second avenue	1,502		Southern's pipe.
East	6 in.	Geauga street	N. L. Broadway to pipe in Svoboda street	284		
East	6 in.	Grape street	Pipe in Schott street, south	190		
East	6 in.	Geneva street	Pipe in Woodland avenue to S. L. Woodland avenue.	80		4 to 6 iron relaid.
East	6 in.	Geneva street	S. L. Woodland avenue to N. L. Beaver street	758		
North	6 in.	Harlem street	T in Kirtland street to 18 ft. W. of Willson avenue	796		
East	6 in.	Hanover street	S. L. Old River street to hydrant at Division street	481		
East	6 in.	Hanover street	Pipe in Division street to 10 ft. N. of Division street	20		4 to 6 iron relaid.
East	6 in.	Hayward street	Pipe in Cedar avenue, south	811		
West	6 in.	Herschell street	Pipe in Literary street to 9 ft. S. of N. L. Marquardt street	1,721		
South	6 in.	Hermann	Pipe in Waverly avenue to pipe in St. Paul street	1,888		
East	6 in.	Hoadley street	Pipe in Superior street to pipe in Payne avenue	1,087		
East	6 in.	Hoadley street	Pipe in Superior street to pipe in St. Clair street	1,165		
South	6 in.	Howard street	Pipe in Scranton avenue to pipe in Jennings avenue	914		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883.—Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
South.	6 in.	Howard street..	W. L. Scranton avenue, west	511		
West	6 in.	Hewitt street	S. L. Euclid, south	228		
West.	6 in.	Hicks street.	Pipe in Bridge street to pipe on Franklin avenue	880		
		Jerry street	See Mentor avenue.			
West..	6 in.	Jennings avenue	Pipe in Clark avenue to 29 ft. S. of N. L. Holmden avenue	1,159		
East	6 in.	Jessie street	Pipe in Garden street to 20 ft. N. of S. L. Cedar avenue	1,567		
North..	6 in.	Julia street..	Pipe in Sawtell avenue to pipe in Seelye avenue	460		
East	6 in.	Kirtland street..	Pipe in East Court to pipe in Superior street	1,121		
East.	6 in.	Kennard street..	S. L. Garden street to N. L. Scovill avenue	1,432		
East	6 in.	Kennard street..	Pipe in Cedar avenue to pipe in Sibley street	441		
South.	6 in.	Keyse street	Pipe in East Madison avenue to W. L. Edwards street	680		
East	6 in.	Lisbon street	Pipe in Woodland avenue, south	228		
West	6 in.	Logan avenue.	Pipe in Cedar avenue, north	419		
West	6 in.	South Logan street	Pipe in Cedar avenue, south	1,067		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883.—Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
West	6 in.	N. Logan street	10 feet N. of Euclid avenue to 9 feet N. of S. L. Lamont street	1,778		
East	6 in.	Lyon street	Pipe in St. Clair street to pipe in Superior street	1,868		
South.	6 in.	Lawn street	Pipe in Waverly avenue to pipe in Gordon avenue	1,254		
South.	6 in.	Mentor avenue	Pipe in Jennings avenue to pipe in Noyes street	351		
North.	6 in.	Miller place	Pipe in Herschell street to 12 ft. E. of Herschell street	58		
West	6 in.	Moltke street	Pipe in Potter Court, north	466		
East	6 in.	Mead street	Pipe in Broadway, north	1,108		
East	6 in.	Martin street	Pipe in Broadway to 296 N. of Warren street	875		
East	6 in.	McHenry street	S. L. St. Clair street to pipe in Superior street	1,102		
West	6 in.	Noyes street	Pipe in Jerry street to N. L. Castle avenue	528		
East	6 in.	New street	Pipe in Garden street, south to connect pipes	17		
East.	6 in.	Osborn street	Pipe in Scovill avenue to 12 ft. south of Garden street	1,298		
East	6 in.	Putnam street	Pipe in Scovill avenue to 7 ft. south of Garden street	1,252		
South.	6 in.	Potter court	Pipe in Pearl street to pipe in Moltke street	217		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883. Continued

Side.	Size.	Street	Between What Points.	Feet Laid.	Totals.	Remarks.
North	6 in.	Pear street	Pipe in Waverly avenue to E. L. Aspen street	560		
West	6 in.	Petrie street	Pipe in Barkwill street to T in Clay street	812		
West,	6 in.	Republic street	N. L. Euclid avenue to pipe in Ansel avenue	2,053		
East	6 in.	Richland avenue	Pipe in Garden street, south	18		
South	6 in.	Rock street	Pipe in Catawba street, east	367		
West.	6 in.	Rhodes avenue	Cross in Vega avenue to 161 ft. N. of Walton Avenue	1,021		
West	6 in.	Russell avenue.	S. L. Hough avenue to 4 ft. S. of Beecher street	1,411		
West	6 in.	Swiss avenue	S. L. Lorain street, south	336		
East	6 in.	Sawtell avenue	Hydrant at Woodland avenue to 243 S. of Julia street	2,248		
East	6 in	Second avenue	S. L. Cedar avenue to N. L. Garden street	1,734		
South.	6 in.	Selye court.	Pipe in Sawtell avenue, west	960		
West	6 in.	Scott street	S. L. Franklin avenue to 502 S. of Bridge street	1,448		
East	6 in.	St. Paul.	Pipe in Hermann street to 27 ft S. of N L. Washington street	334		
South.	6 in.	Starkweather.	Pipe in Scranton avenue to pipe in Jennings avenue	1,004		
South	6 in	Svoboda	Pipe in Forest street to pipe in Geauga street	606		
West	6 in.	Streator avenue.	Pipe in Cedar avenue to 9 ft. S. of Euclid avenue	1,525		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883.—Continued.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Totals.	Remarks.
North..	6 in.	Schott street	Pipe in Gordon avenue to 74 ft. E. of Grape street.....	566		
East	6 in.	Slater avenue.	Pipe in Griswold street to S. L. Woodland avenue ..	383		
South .	6 in.	Third avenue..	Pipe in Second avenue to E. L. Willson avenue	1,782		Southern's pipe.
South.	6 in.	Vega avenue	Pipe in Rhodes avenue, east	354		
South.	6 in.	Wade avenue..	Pipe in Rhodes avenue to 8 ft. E. of W. L. Hitchcock street	981		
South.	6 in.	Walton avenue.....	Pipe in Hitchcock street to E. L. Mill street........	686		
West	6 in.	Waverly avenue	S. L. Detroit street to N. L. Franklin avenue	780		
South.	6 in.	West Clinton..	Pipe in Waverly avenue to 12 ft. W. of Waverly avenue	86		
East	6 in.	Woodland court	S. L. Woodland avenue, south	900		
South.	6 in.	Wilbur street..	Pipe in Streator avenue to 7 ft. E. of Streator avenue..	48		
North..	6 in.	Willey street..	9 ft. E. of W. L. Scranton avenue, west	608		
East	6 in.	Wadsworth street	Pipe in Orange street to pipe in Croton street..........	602		
East	6 in.	Watkins street	Pipe in Cedar avenue to 8 ft N. of Cedar avenue	48	82,172	
East	4 in.	Armitage..	From 6 in. T at angle in Armitage street, north	118		
East. ..	4 in.	Chapel.	Pipe in Creighton street, south..................	169		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1883.—Concluded.

Side.	Size.	Street.	Between What Points.	Feet Laid.	Total.	Remarks.
South.	4 in.	Floyd	From Y in Jackson street, east, to Fleming alley.	346		
West	4 in.	Sked	Pipe in Scovill avenue to 7 ft. N. of Scovill avenue	45		
East	4 in.	Rockford	Pipe in Superior street, north	581		
South.	4 in.	Mason alley.	Pipe in Case avenue, east	322		
East	4 in.	Huntington..	Pipe in Euclid avenue to N. L. Prospect street	460		
South.	4 in.	Hazen.	Pipe in Chapel street to E. L. Perry	537		
West	4 in.	Ontario	Pipe in Bolivar street to 24 ft. N. of Eagle street	394		
	4 in.	For Hydrants		2,490	5,312	
	3 in.	Pearl street.	Pipe in Pearl street, west, (163 ft. S. of Monroe street.)	32		
	3 in.	Hydrants		50	82	
					121,480	

[illegible] OF PIPE TAKEN UP AND RELAID IN 1883.

[illegible]	[illegible]	Between What Points.	Feet Laid	Total.	Remarks.
[illegible]	[illegible]	[illegible] street to valve 16 ft. N. of [illegible] street	140		Cement.
[illegible]	[illegible]	Pipe in [illegible] street to 12 ft. S. of [illegible] street	333		Iron.
[illegible]	[illegible]	[illegible] pipe in Quincy street, north	87		Iron.
[illegible]	[illegible]	Pipe in Woodland avenue to S. L. Woodland avenue,	80		Iron.
[illegible]	[illegible]	[illegible] Prospect street to 8 ft. E. of Erie street	1088		Cement.
[illegible]	[illegible]	Pipe in [illegible] street to [illegible] W. side of Public Square	237		Iron.
[illegible]	[illegible]	[illegible] pipe in Superior street to N. L. Superior street	57		
[illegible]	[illegible]		874	1,019	

TOTAL FEET OF PIPE LAID TO DECEMBER 31st, 1883.

	DIAMETER OF PIPE IN INCHES.										
	36	30	24	20	16	12	10	8	6	4	3
Laid previous to 1883..	2,000	35,040	10,989	11,002	12,628	8,529	69,473	139,343	368,074	135,392	14,992
Laid in 1883..	7,130	2,047				135	10	24,001	82,172	5,312	82
Total .	9,130	37,087	10,989	11,002	12,628	8,664	69,483	163,344	450,246	140,704	15,074
Taken up in 1883								146	70	1,342	374
Total in use..	9,130	37,687	10,989	11,002	12,628	8,664	69,483	163,198	450,176	139,362	14,700
				81,436					847,515		

RECAPITULATION OF WATER PIPE IN USE.

81,436 feet of supply main	Equal to	15 miles,	2,236 feet.
847,515 feet of distributing main	Equal to	160 miles,	2,715 feet.
928,951 feet,	Equal to	175 miles,	4,951 feet.
9,777 feet increased supply main in 1883	Equal to	1 mile,	4,497 feet.
111,712 feet increased distributing main in 1883	Equal to	21 miles,	832 feet.
121,489 feet increased main in 1883	Equal to	23 miles,	49 feet.

1,932 feet of pipe taken up and relaid, of all sizes, in 1883.

SCHEDULE SHOWING STREETS IN WHICH WATER PIPE WAS LOWERED IN 1883.

Side.	Size.	Street.	Location.	Feet.	Total.
East	6 in.	Case avenue	Pipe in Scovill to north line Woodland	1,294	
South..	8 in.	Center street..	North line Viaduct to Hemlock street	1,426	
		Center street..	Intersections	140	
North..	6 in.	Euclid avenue	Pipe in Perry to Case avenue	4,588	
North..	6 in.	Euclid avenue	Kennard street to Willson ave.	918	
North..	10 in.	Euclid avenue	230 feet west of Bolton to Fairmount street.	3,445	
		Euclid avenue	Intersections	456	
North..	12 in.	Ohio street	Erie street to 100 feet west of Brownell street.	1,060	
		Ohio street	Intersections	56	
South..	6 in.	Parkman street.	From Erie to Brownell	1,160	
South..	10 in.	Scovill avenue	West line Case avenue to Willson avenue.	1,710	
		Scovill avenue.	Intersections	144	
West	4 in.	State street.	Franklin to Clinton.	420	
North..	10 in.	Superior street	From 8 feet east of Erie to east line Perry street.	3,260	

SCHEDULE SHOWING STREETS IN WHICH WATER PIPE WAS LOWERED IN 1883.

CONCLUDED.

[illegible]	Location.	Feet.	Total.
[illegible]	Intersections	285	
[illegible]	East line Public Square to 16 inch pipe in Erie street	1,380	
[illegible]	Intersections	100	
[illegible]	Superior to St. Clair street	618	27,650

5 Miles, 1,250 feet of pipe lowered.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.

No.	Size.	Side	Street.	Feet	Location.	Remarks.
1	4 in.	East	Ancel avenue.	276	North of Doan street.	
1	4 in.	East	Ancel avenue.	140	North of Republic street.	
1	4 in.	East	Ancel avenue.	529	North of Republic street.	
1	4 in.	South	Apple street.	115	East of Harbor street	
1	4 in.	East	Armitage street.	193	North of St. Clair street	
1	4 in.	East	" "	154	North of Carry street.	
1	4 in.	East	" "	524	North of Carry street.	
1	4 in.	East	Armitage court	118	North of 6 inch T in Armitage street	
1	3 in.	East	Baker street	237	North of White avenue.	
1	3 in.	East	" "	565	North of White avenue.	
1	4 in.	South.	Barkwill street.	8	West of Richardson avenue	
1	4 in.	South.	" "		At angle in Barkwill street.	
1	4 in.	South.	" "	336	East of Petrie street	
1	4 in.	South.	" "		At Petrie street.	
1	4 in.	South.	Bayne street.	218	West of Waverly street.	
1	4 in.	South.	" "	61	West of Aspen street	
1	4 in.	South	" "		At Gordon avenue	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet	Location.	Remarks.
1	4 in.	West	Birch street	247	South of Franklin avenue..	
1	4 in.	West	" "	681	South of Franklin avenue	
1	4 in.	West	" "	240	North of Bridge street	
1	4 in.	West	" "	299	South of Bridge street	
1	4 in.	West	" "	10	South of Duke street..	
1	4 in.	West	" "	104	North of Lorain street..	
1	4 in.	East	" "	145	South of Lorain street	
1	4 in.	East	" "	496	South of Lorain street	
1	3&4 in.	South.	Bolivar street		At Prospect street	
1	3&4 in.	South.	" "	255	East of Erie street	
1	4 in.	South	" "	355	West of Prosp ct street	
1	4 in.	West	Bolton avenue	144	North of Quincy street..	
1	4 in.	South.	Burwell street		At Arch street.	
1	4 in.	South.	Branch street	105	West of Abram street	
1	4 in.	South.	" "		At Newell street.	
1	4 in.	North	Creighton street	188	West of Chapel street	
1	4 in.	East	Penn avenue	900	South of Garden street	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1888.—Continued.

No.	Size.	Side.	Street.	Feet	Location.	Remarks.
1	4 in.	East	Case avenue	634	South of Garden street	
1	4 in.	East.	" "	818	North of Scovill avenue	
1	4 in.	South.	Cedar avenue	130	West of Streator avenue	
1	4 in.	South.	" "		At North Logan street	
1	4 in.	South.	" "	226	East of Brenton street	
1	4 in.	South.	" "	17	West of Brooker avenue	
1	4 in.	South.	" "	38	East of Watkins street	
1	4 in.	East	Catawba street	304	South of Croton street	
1	4 in.	South.	Castle avenue	54	West of Milton street	
1	4 in.	South.	" "	4	West of Abram street	
1	4 in.	South.	Clarke avenue	190	East of Jennings avenue	
1	4 in.	South.	" "		At Merchant avenue	
1	4 in.	East	Central Way	272	South of Jefferson street	
1	4 in.	East	" "	12	South of Scothan street	
1	4 in.	East	Clara street	164	North of White avenue	
1	4 in.	East	" "	579	North of White avenue	
1	4 in.	South.	Clinton street	286	West of State street	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	East	Doan street	241	North of Euclid avenue	
1	4 in.	West	" "	605	North of Euclid avenue	
1	4 in.	West	" "		At Ansel avenue	
1	4 in.	East	Dille street	202	North of Broadway	
1	4 in.	North.	Division street	6	East of Hickory street	
1	4 in.	North.	Davis Court	450	West of Sawtell avenue	
1	4 in.	East	Douse street	224	North of Broadway	
1	4 in.	East.	" "	650	North of Broadway	
1	4 in.	East	" "	1,114	North of Broadway	
1	4 in.	East	Dana street	14	North of Glass avenue	
1	4 in.	East.	" "	370	South of Glass avenue	
1	4 in.	East	" "	85	South of Bonna street	
1	4 in.	East.	" "	75	North of Harriett street	
1	4 in.	West	Elm street		At Washington street	
1	4 in.	East	East Madison avenue	850	South of Woodland avenue	
1	4 in.	East	" " "	880	North of Ewald street	
1	4 in.	East	" " "		At Grand avenue	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	East	East Madison avenue.		At Lexington street....	
1	4 in.	East	" " "		At Lena street............	
C. 1	3to4 in.	North.	Euclid avenue	24	East of Sheriff street	
1	4 in.	North.	" "	179	East of Perry street	
1	4 in.	North.	" "	381	East of Oliver street	
1	4 in.	North.	" "	815	East of Sterling avenue....	
1	4 in.	North.	" "	800	West of Case avenue.........	
C. 1	3to4 in.	South.	" "	49	West of Oliver street..	
C. 1	3to4 in.	North.	" "	867	East of Oliver street.........	
C. 1	3to4 in.	North.	" "	888	East of Sterling avenue....................	
C. 1	3to4 in.	South.	" "	1,263	West of Case avenue.......	
C. 1	3to4 in.	North.	" "	842	West of Case avenue...	
1	8 in.	South.	Floyd street	230	East of Jackson street	
1	4 in.	East	Florence street	299	North of Woodland avenue	
1	4 in.	South.	Franklin avenue.....		At Hunt street...............	
1	3 in.	North.	First alley north of Infirmary		At Ackley street	
1	4 in.	South.	Fifth avenue	339	West of Second avenue	

[illegible] SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

[illegible]	Size.	Side.	Street.	Feet.	Location.	Remarks.
	[illegible]	[illegible]	[illegible]	414	East of Willson avenue	
	[illegible]	South		250	West of Second street	
	[illegible]	[illegible]	[illegible]	75	West of Jessie street	
	[illegible]	[illegible]	[illegible]	152	South of Lawn street from the west	
	[illegible]	[illegible]	[illegible]	150	South of [illegible] street	
	[illegible]	[illegible]	[illegible]		At Woodland avenue	
	[illegible]	[illegible]		418	South of Woodland avenue	
	[illegible]	[illegible]			At Hanvey street	
	[illegible]		[illegible]	880	East of Kirtland street	
	[illegible]	[illegible]	[illegible]	417	South of Literary street	
	[illegible]	[illegible]		76	North of Jefferson street	
	[illegible]	[illegible]		250	South of Jefferson street	
	[illegible]	[illegible]	" "		At Marquardt street	
1	4 in.	South	Hermann street	148	West of St. Paul street	
1	4 in.	South	" "	225	East of Waddell street	
1	4 in.	South	" "	104	West of Waddell street	
1	4 in.	West	Huntley street.	100	South of St Clair street	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	West.	Hoadley street	326	North of Superior street	
1	4 in.	East	" "	330	South of Superior street	
1	4 in.	East	" "	778	South of Superior street	
1	4 in.	East	" "	276	North of Payne avenue	
1	4 in.	South.	Howard street	378	East of Scranton avenue	
1	3 in.	South.	" "	216	West of Scranton avenue	
1	4 in.	South.	" "	511	West of Scranton avenue	
1	4 in.	West	Hewitt avenue	191	South of Euclid avenue	
1	4 in.	West	" "	548	South of Euclid avenue	
1	4 in.	West	" "	917	South of Euclid avenue	
1	4 in.	West	Hicks street	308	South of Franklin avenue	
1	4 in.	East	Huntington street	188	North of Prospect street	
1	4 in.	South.	Hazen street	211	East of Perry street	
1	4 in.	West.	Jennings avenue	236	South of Clarke avenue	
1	4 in.	West	" "	99	North of Buhrer street	
1	4 in.	West	" "		At Holmden street	
1	4 in.	East	Jessie street	818	North of Garden street	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
[illegible]	4 in.	East	Jessie street	728	North of Garden street	
[illegible]	4 in.	East	" "	884	South of Cedar avenue	
[illegible]	4 in.	East	" "		At Cedar avenue	
[illegible]	4 in.	North	Julia street	106	West of Seelye street	
[illegible]	4 in.	East	Kirtland street	15	North of Harlem street	
[illegible]	4 in.	East	" "	62	North of Elizabeth street	
[illegible]	4 in.	East	Kennard street	808	South of Garden street	
[illegible]	4 in.	East	" "	708	South of Garden street	
[illegible]	4 in.	East	" "	829	North of Scovill avenue	
[illegible]	4 in.	South	Keyes street	806	East of East Madison avenue	
[illegible]	4 in.	South	" "		At Edwards street	
[illegible]	4 in.	West	South Logan street	249	South of Cedar avenue	
[illegible]	4 in.	West	" " "	617	South of Cedar avenue	
1	4 in.	West	" " "	1,060	South of Cedar avenue	
1	4 in.	West	North Logan street	373	North of Euclid avenue	
1	4 in.	West	" " "	722	North of Euclid avenue	
1	4 in.	West	" " "	700	South of Lamont street	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	West	North Logan street.	340	South of Lamont street	
1	4 in	West	" " "		At Lamont street	
1	4 in.	East	Lyon street	314	North of Superior street	
1	4 in.	East	" "	61	North of Prosser street	
1	4 in.	East	" "	267	South of Glass avenue	
1	4 in.	East	" "	90	North of Glass avenue	
1	4 in.	South..	Lawn street	815	West of Waverly street	
1	4 in.	South..	" "	108	West of Aspen street	
1	4 in.	South	" "		At Gordon avenue	
1	4 in.	North.	Lake street	257	East of Lawrence street	
1	4 in	North.	" "	601	East of Lawrence street	
C. 1	[illegible] in	North .	Lorain street		At Dare street	
1	4 in.	West	Moltke street	154	North of Potter court	
1	4 in.	West	" "	451	North of Potter court	
1	4 in.	East	Martin street	158	North of Broadway	
1	4 in.	East	" "	298	North of Warren street	
1	4 in	East	Mead street	156	North of Broadway	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet	Location.	Remarks.
1	4 in.	East	Mead street	86	North of Dakota street	
1	4 in.	South	" "	213	East of angle in Mead street	
1	4 in.	East	McHenry street	260	South of St. Clair street	
1	4 in.	East	" "	890	North of Superior street	
1	4 in.	South	Mason alley	292	East of Case avenue	
1	4 in.	West	Noyes street	72	South of Mentor avenue	
1	4 in.	West	" "	14	North of Castle avenue	
1	4 in.	South	Ontario street	16	East of Bolivar street	
1	4 in.	South	Orange street	818	East of Forest street	
1	4 in.	South	" "	308	West of Case avenue	
1	4 in.	South	" "	13	West of Forest street	
1	4 in.	East	Oxford street	830	North of St. Clair street	
1	4 in.	East	" "	44	North of angle in Oxford street	
1	4 in.	East	" "	447	North of angle in Oxford street	
1	4 in.	East	" "	907	N. of angle in Oxford st., or near the L. S. & M. S. R. R.	
1	4 in.	East	Osborn street	178	North of Scovill avenue	
1	4 in.	East	" "	556	North of Scovill avenue	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side	Street.	Feet	Location.	Remarks.
1	4 in.	East	Osborn street	328	South of Garden street	
1	4 in.	East	Putnam street	291	North of Scovill avenue	
1	4 in.	East	" "	608	North of Scovill avenue	
1	4 in.	East	" "	160	South of Garden street	
1	4 in.	North	Pear street	200	West of Waverly street	
1	4 in.	North	" "		At Aspen street	
1	4 in.	West	Petrie street	79	South of Hamm street	
1	4 in.	West	" "		At Clay street	
1	4 in.	South	Quincy street	256	West of Edwards street	
1	4 in.	South	" "	44	East of Edwards street	
1	4 in.	South	" "	100	West of Southern avenue	
1	4 in.	South	" "		At Congress street	
1	4 in.	South	" "	296	West of Bolton avenue	
1	3 in.	East	Rockford street	487	North of Superior street	
1	4 in.	North	Rockwell street		At Ontario street	
1	4 in.	West	Republic street	878	North of Euclid avenue	
1	4 in.	West	" "	706	North of Euclid avenue	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
	[illegible]	West	Republic street	[illegible]	South of Lamont street	
	[illegible]	West	" "	122	South of Lamont street	
	[illegible]	West	" "	[illegible]	South of Angel avenue	
	[illegible]	South	Rock street	[illegible]	East of Catawba street	
	[illegible]	West	Rhodes avenue	34	North of Erin street	
	[illegible]	West	" "	7	South of Wade street	
	[illegible]	West	Russell avenue		At Quimby street	
	[illegible]	West	" "	9	North of Lexington street	
	[illegible]	West	" "	8	South of Beecher street	
[illegible]	[illegible]	[illegible]	Swiss street	[illegible]	South of Lorain street	
[illegible]	[illegible]	West	Scranton avenue	200	South of Carter street	
[illegible]	[illegible]	West	State street	18	South of Clinton street	
[illegible]	[illegible]	North.	Superior street.	480	East of Kirtland street	
[illegible]	[illegible]	North.	" "	870	West of Willson avenue	
[illegible]	[illegible]	South.	" "	240	East of Erie street	
[illegible]	[illegible]	North.	" "		At Muirson street	
[illegible]	[illegible]	South.	" "	580	East of Muirson street	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet	Location.	Remarks.
C. 1	3&4 in.	North.	Superior street	445	West of Dodge street	
C. 1	3&4 in	North..	" "	144	East of Huntington street	
C. 1	3&4 in.	South.....	" "		At Perry street	
C. 1	3&4 in.	East ..	Sterling avenue		At Euclid avenue	
1	4 in.	East.	Sawtell avenue.	443	South of Woodland avenue	
1	4 in.	East....	" "	15	North of Grove court	
1	4 in.	East	" "	95	North of Seelye court	
1	4 in.	East	" "		At Davis court	
1	4 in.	East.... ..	" "	22	North of Julia street	
1	4 in.	East.	" "	243	South of Julia street	
1	4 in.	West ...	Second avenue	70	South of Fourth avenue	
1	4 in.	South. ..	Seelye court	376	West of Sawtell avenue	
1	4 in.	South..	" "	820	West of Sawtell avenue	
1	4 in.	West ..	Scott street	432	North of Bridge street	
1	4 in.	West..	" "	478	South of Bridge street	
1	4 in.	South..	Starkweather avenue	283	East of Scranton avenue	
1	4 in.	South.	Starkweather avenue.	239	West of Jennings avenue	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	South.	Svoboda street		At Geauga street	
1	4 in.	South.	" "	825	West of Geauga street	
1	4 in.	West	Streator avenue	420	South of Euclid avenue	
1	4 in.	West	" "	852	North of Wilbur street	
1	4 in.	West	" "		At Wilbur street	
1	4 in.	North.	Schott street	225	East of Gordon avenue	
1	4 in.	East	Slater street	71	South of Woodland avenue	
1	4 in.	South.	St. Clair street	155	West of Lyon street	
1	4 in.	South.	" "	126	West of Dana street	
1	4 in.	South.	" "	76	West of Munich street	
1	4 in.	South.	" "		At Oxford street	
1	4 in.	South.	" "		At East madison avenue	
1	4 in.	South.	" "	196	West of Merkel street	
1	4 in.	North.	" "	190	East of Merkel street	
1	4 in.	South.	" "		At Becker avenue	
1	4 in.	South.	Third avenue	400	East of Willson avenue	
1	4 in.	South.	" "	791	East of Willson avenue	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1883.—Concluded.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	South.	Third avenue..	540	West of Second avenue	
1	4 in.	South..	" "	125	West of Second avenue	
1	4 in.	South.	Vega avenue	78	East of Rhodes avenue	
1	4 in.	South.	Wade avenue	423	East of Rhodes avenue	
1	4 in.	South..	Walton avenue	282	West of Mill street	
1	4 in.	East	Waverly street		At West Clinton street	
1	4 in.	East	" "	82	South of Franklin avenue	
1	4 in.	East	" "	291	North of Bridge street	
1	4 in.	East	" "	154	North of Bayne street	
1	4 in.	East	" "		At Pear street	
1	4 in.	East.	" "		At West Madison avenue	
1	4 in.	East	Woodland court	49	South of Woodland avenue	
1	4 in.		" "	474	South of Woodland avenue	
1	4 in.		" "	900	South of Woodland avenue	
1	4 in.	North.	Willey street	845	West of Petroleum street	
1	4 in.	East	Wadsworth street.	211	South of Orange street	
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SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS CHANGED IN 1888.

No.	[illegible]	[illegible]	Side.	Street.	Feet	Location.
1	8 in.	4 in.	South	Bolivar street		At Prospect street, moved from north side to south side.
1	8 in.	4 in.	North	" "	255	East of Erie street, moved from 870 feet east of Erie street.
1	8 in.	4 in.	South.	Euclid avenue	24	East of Sheriff street, moved from 102 feet east of Sheriff street.
1	8 in.	4 in.	South	" "	49	West of Oliver street.
1	8 in.	4 in.	North	" "	807	East of Oliver street, moved from 705 feet east of Oliver street.
1	8 in.	4 in.	North..	" "	888	East of Sterling ave., moved from 580 feet east of Sterling ave.
1	8 in.	4 in.	South	" "	1268	West of Case avenue.
1	8 in.	4 in.	North.	" "	842	West of Case avenue, moved from 682 feet west of Case ave.
1	8 in.	4	East	Geneva street		At Woodland avenue.
1	8 in.	4 in.	North	Lorain street		At Dare street.
1	8 in.	4 in.	South	Superior street	240	East of Erie street.
1	8 in.	4 in.	North..	" "		At Muirson street.
1	8 in.	4 in.	South.	" "	880	East of Muirson street.
1	8 in.	4 in.	North.	" "	448	West of Dodge street.
1	8 in.	4 in.	North.	" "	144	East of Huntington street.
1	8 in.	4 in.	South.	" "		At Perry street.
1	8 in.	4 in.	East	Sterling avenue		At Euclid avenue, moved west side to east side.
17						

RECAPITULATION OF HYDRANTS FOR 1883.

Hydrants set in 1883 of 3 inch	7
Hydrants set in 1883—of 4 inch	247
Total Hydrants set in 1883	254
Total Hydrants in use December 31st, 1882	1,264
Total	1,518
Hydrants changed in 1883	17
Total Hydrants in use December 31st, 1883	1,501

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.

No.	Size.	Street.	Side.	Location.	Remarks.
[illegible]	[illegible]	[illegible]	North.	East line Willson avenue	
[illegible]	[illegible]		North.	8 feet east of Giddings avenue	
[illegible]	[illegible]		North.	East line Lincoln avenue	
[illegible]	[illegible]	[illegible] stop gates			
[illegible]	[illegible]	[illegible]	East	North line Quincy street	
[illegible]	[illegible]		East	South line Quincy street	
[illegible]	[illegible]	[illegible] stop gates			
[illegible]	[illegible]	[illegible] street	East	South line Franklin avenue	
[illegible]	[illegible] in.	[illegible] avenue	North.	West line Doan street	
[illegible]	8 in.	Bolivar street	East	Connection valve 10 feet west of east line, Bolivar street and 58 feet north of south line Ontario street.	
1	8 in.	Bolton avenue	West	North line Quincy street	
1	8 in.	Cedar avenue	South.	West line Brooker avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	8 in.	Cedar avenue	South.	West line Streator avenue	
C. 1	6to8 in.	Case avenue	East	South line Garden street	
1	8 in.	" "	East.	North line Scovill avenue	
1	8 in.	Columbus street	East	North line of block on south west corner of Lorain and Columbus street, or 104 feet south of Lorain street.	
1	8 in.	East madison avenue	East	334 feet north of Ewald street at fire hydrant	
1	8 in.	Lake street	North.	East line Lawrence street	
1	6 in.	Orange street	South.	West line Forest street	
1	8 in.	" "	South.	East line Forest street	
1	8 in.	" "	South.	West line Case avenue	
1	8 in.	Oxford street	East.	North line St. Clair street	
1	8 in.	" "	East	680 ft. N. of St. Clair, st. or at hydrant north of angle in st.	
1	8 in.	Oliver street	East	North line Euclid avenue	
1	8 in.	Payne avenue	North.	West line Perry street	
1	8 in.	Quincy street	North.	25 feet west. of east. line Giddings avenue, and 2 feet south of north line Quincy street, from the east	
1	8 in.	" "	South.	East line East Madison avenue	

TABLE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN [illegible].—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
[illegible]		[illegible]	South	East line [illegible] avenue	
			South	East line [illegible] street	
			South	West line Bolton avenue	
[illegible]		[illegible]	South	West line Ontario street	
			South	West line Public Square	
		[illegible]	South	East line Willson avenue	
			South	East line Doan street	
			South	East line [illegible] street	
			South	East line Market street	
			South	East line Hoyt avenue	
		[illegible]	South	West line Seneca street, from the north	
[illegible]		[illegible]	West	South line Superior street	
	[illegible]	[illegible]	East	80 feet N. of Euclid ave., or 14 ft. N. of second hydrant.	
[illegible]	6 in	W[illegible] street	East	North line Bridge street	
[illegible]	6 in	"	East	South line Bridge street	
[illegible]	6 in	"	East	North line Pearl street	
[illegible]	6 in	Total 6 inch stop gates.			

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued.

No.	Size	Street.	Side.	Location.	Remarks.
1	6 in.	Apple street	South.	West line Orchard street.	
1	6 in.	" "	South.	East line Harbor street	
1	6 in.	Armitage street	East	North line St. Clair street	
1	6 in.	" "	East	North line Carry street	
1	6 in.	Abram street	West	South line Clark avenue	
1	6 in.	Baker street	East.	North line White avenue	
1	6 in.	Barkwill street	South.	West line Broadway	
1	6 in.	" "	South.	North line Barkwill street at angle	
1	6 in.	" "	South.	East line Petrie street	
1	6 in.	Bayne street	South.	West line Waverly street	
1	6 in.	" "	South.	West line Aspen street	
1	6 in.	" "	South.	East line Gordon avenue	
1	6 in.	Beech street	East	North line Scovill avenue	
1	6 in.	Birch street	West	North line Bridge street	
1	6 in.	" "	West	South line Bridge street	
1	6 in.	" "	East	South line Lorain street	
1	6 in.	Bond street	West	South line Superior street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Brenton street	West	South line Cedar avenue	
1	6 in.	Burwell street	South	West line Forest street	
1	6 in.	Branch avenue	South	East line Scranton avenue	
1	6 in.	" "	South	East line Abram street	
1	6 in.	" "	South	West line Jennings avenue	
1	6 in.	Catawba street	East	South line Croton street	
1	6 in.	Castle avenue	South	East line Scranton avenue	
1	6 in.	Clark avenue	South	East line Jennings avenue	
1	6 in.	" "	South	West line Merchant avenue	
1	6 in.	Creighton street	North	West line Chapel street	
1	6 in.	Central Way	East	South line Jefferson street	
1	6 in.	" "	East	South line Scothan street	
1	6 in.	Cutler street	West	South line Euclid avenue	
1	6 in.	Clara street	East	North line White avenue	
1	6 in.	Dille street	East	North line Broadway	
1	6 in.	" "	East	South line Warren street	
1	6 in.	Division street	North	East line Hanover street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Davis court	North.	West line Sawtell avenue	
1	6 in.	Douse street	East	North line Broadway	
1	6 in.	Dana street	East	South line St. Clair street	
1	6 in.	" "	East	At angle 171 feet north of Benna street	
1	6 in.	" "	East	North line Superior street	
1	6 in.	East Madison avenue	East.	South line Lena street	
1	6 in.	Florence street.	East	South line Cypress street	
1	6 in.	Franklin avenue	South.	West line Hurd street	
1	6 in.	First alley north of Infirmary	South.	East line Pearl street	
1	6 in.	" " " "	South.	West line Scranton avenue	
1	6 in.	Fifth avenue	South.	West line Second avenue	
1	6 in.	Fourth avenue	South.	West line Second avenue	
1	6 in.	Grape street	East	South line Schott street	
1	4 to 6 in.	Geneva street	East	South line Woodland avenue	
1	6 in.	Harlem street.	North.	East line Kirtland street	
1	6 in.	Hayward street.	East	South line Cedar avenue	
1	8 in.	Herschell street	West	South line Literary street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued.

No.	Size	Side	Street	Location.	Remarks.
[illegible]	[illegible]	[illegible]	[illegible] street	South line Jefferson street	
[illegible]	[illegible]	[illegible]		North line Marquardt street	
[illegible]	[illegible]	South	[illegible] street	East line Waverly street	
[illegible]	[illegible]	South		West line Waddell street	
[illegible]	[illegible]	South		East line Waddell street	
[illegible]	[illegible]	South		West line St. Paul street	
[illegible]	[illegible]	[illegible]	[illegible] street	South line St. Clair street	
[illegible]	[illegible]	[illegible]	"	North line Superior street	
[illegible]	[illegible]	[illegible]	"	South line Superior street	
[illegible]	[illegible]	[illegible]	" "	North line Payne avenue	
[illegible]	[illegible]	South	[illegible] street	East line Scranton avenue	
[illegible]	[illegible]	South	"	West line Jennings avenue	
1	[illegible]	West	[illegible] avenue	South line Euclid avenue	
1	6 in.	West	Hicks street	South line Franklin avenue	
1	6 in.	West	" "	North line Bridge street	
1	6 in.	West,	Jennings avenue.	South line Clark avenue	
1	6 in.	West	" "	North line Buhrer avenue, from the west	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.- Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Jessie street	East	South line Cedar avenue	
1	6 in.	" "	East	779 feet south of Cedar avenue, at hydrant	
1	6 in.	" "	East.	North line Garden street	
1	6 in.	Juliastreet	North	East line Sawtell avenue	
1	6 in.	Kirtland street	East	North line Harlem street	
1	6 in.	" "	East	South line Superior street	
1	6 in.	Kennard street	East	South line Garden street	
1	6 in.	" "	East.	South line Sibley street	
1	6 in.	" "	East	North line Cedar avenue	
1	6 in.	Keyes street	South.	East line East Madison avenue	
1	6 in.	Lisbon street	East	South line South Woodland avenue	
1	6 in.	Logan street	West	North line Cedar avenue	
1	6 in.	South Logan street	West	South line Cedar avenue	
1	6 in.	North Logan street	West	704 feet south of Lamont street	
1	6 in.	" " "	West	South line Lamont street	
1	6 in.	Lyon street	East	South line St. Clair street	
1	6 in.	" "	East	South line Kindsvater street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
	3 in.	Lyon street	East	North line Superior street	
1	3 in.	Lowen street	South	West line Waverly street	
	6 in.		South.	West line aspen street	
	6 in.		South.	East line Gordon avenue	
	6 in.	Mentor avenue	South.	East line Jennings avenue	
1	3 in.	Miller place	North.	East line Herschell street	
1	6 in.	[illegible] street	West	North line Potter court	
1	6 in.	Mead street	East	North line Broadway	
1	6 in.		East	East line Mead street, at angle	
1	6 in.	Martin street	East	North line Broadway	
1	6 in.	" "	East	South line Warren street	
1	6 in.	" "	East.	North line Warren street	
1	6 in.	Mellonry street.	East.	North line Superior street	
1	6 in.	Noyes street.	West	South line Mentor avenue	
1	6 in.	[illegible] street	East	North line Scovill avenue	
1	6 in.	Putnam street	East.	North line Scovill avenue	
1	6 in.	Potter court	South	East line Pearl street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued

No.	Size.	Street.	Side.	Location.	Remarks
1	6 in.	Pear street	North.	West line Waverly street	
1	6 in.	Petrie street	West	South line Barkwill street	
1	6 in.	" "	West	North line Clay street	
1	6 in.	Republic street	West.	572 feet south of Lamont street	
1	6 in.	" "	West	South line Ansel avenue	
1	6 in.	Rock street	South.	East line Catawba street.	
1	6 in.	Rhodes avenue	West	North line Seymour avenue	
1	6 in.	" "	West	South line Vega avenue	
1	6 in.	Russell avenue	West	North line Hough avenue	
1	6 in.	" "	West	South line Hough avenue	
1	6 in.	" "	West	North line Lexington street	
1	6 in.	" "	West	South line Lexington street	
1	6 in.	Sales street	West	South line Lorain street	
1	6 in.	Sawtell avenue	East	South line Grove court	
1	6 in.	" "	East	South line Davis street	
1	6 in.	Seelye court	South.	West line Sawtell avenue	
1	6 in.	Scott street	West.	North line Bridge street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
	[illegible]	[illegible] street	West	South line Bridge street	
	[illegible]	St. [illegible] street	East	South line Hermann street	
	[illegible]	[illegible]	South	East line Scranton avenue	
	[illegible]		South	West line Jennings avenue	
	[illegible]	[illegible]	South	East line Forest street	
	[illegible]		South	West line [illegible] street	
	[illegible]	[illegible]	West	302 feet north of Willson street	
	[illegible]		West	North line Cedar avenue	
	[illegible]	[illegible]	North	East line Gordon avenue	
	[illegible]	[illegible]	East	South line Woodland avenue	
	[illegible]	[illegible]	South	10 feet east of west line Second avenue, from the south	
	[illegible]	[illegible]	South	East line Rhodes avenue	
	[illegible]	[illegible] street	South	East line Rhodes avenue	
	[illegible]		North	West line Hitchcock street	
	[illegible]	[illegible] avenue	South	West line Mill street	
1	6 in.	[illegible]	South	East line Hitchcock street	
1	6 in.	West [illegible] street	South	West line Waverly street	
1	6 in.	Willson street	South.	East line Streator avenue	
1	6 in.	Willey street	South.	West line Scranton avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1883.—Concluded.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Wadsworth street	East	South line Orange street	
1	6 in.	" "	East	North line Croton street	
1	6 in.	Watkins street	East	North line Cedar avenue	
141	6 in.	Total 6 inch stop gates.			
1	4 in.	Creighton street	North.	East line Perry street	
1	4 in.	Floyd street	South	East line Jackson street	
1	4 in.	Hazen street	South.	West line Chapel street	
1	4 in.	Huntington street	East	South line Euclid avenue	
1	4 in.	Mason alley	South.	East line Case avenue	
1	4 in.	Ontario street	West	South line Bolivar street	
1	4 in.	Rockford street	East	North line Superior street	
1	4 in.	Shed street	West	North line Scovill avenue	
248	4 in.	For hydrants			
256	4 in.	Total 4 inch stop gates.			
1	3 in.	Pearl street	West	163 ft. S. of Monroe st. and 20 ft. E. of W. L. Pearl street	
6	3 in.	For hydrants			
7	3 in.	Total 3 inch stop gates.			

RECAPITULATION OF STOP GATES FOR 1883.

Waterway in inches	in. 36	in. 30	in. 24	in. 20	in. 16	in. 12	in. 10	in. 8	in. 6	in. 4	in. 3	Total.
Set previous to 1883	1	22	6	17	21	19	86	239	702	1279	226	2,740
Set in 1883 .. .	3					2	1	35	141	286	7	465
Total	4	22	6	17	21	21	87	274	843	1565	233	3,165
Taken out in 1883 ..					..				1	3	17	21
Total in use December 31st, 1883.	4	22	6	17	21	21	87	274	842	1562	216	3,184

CORNISH ENGINE, RECORD FOR 1883.

EAST ENGINE.

MONTHS.	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January.	19	147	35	66,375	18,500	66,400	84,900	21,306,375	159.394	88,432,254
February.	2	18	45	9,050	2,400	9,200	11,600	2,905,050	160.041	88,518,028
Totals and averages	21	166	20	75,425	20,900	75,600	96,500	24,211,425	159.717	88,511,581

CORNISH ENGINE, RECORD FOR 1883.—Continued.

WEST ENGINE.

MONTHS.	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
July	1	3	20	1,575	3,000	1,600	4,600	505,575	157.016	14,514,660
August	3	18	5	8,190	7,000	8,200	15,200	2,628,990	158.666	22,949,090
Totals and averages	4	21	25	9,765	10,000	9,800	19,800	3,134,565	158.281	21,956,583

CORNISH ENGINE, RECORD FOR 1883 - Concluded.

BOTH ENGINES.

	Days.	PUMPING.			COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and decimals.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
East engine	21	166	20	75,425	20,900	75,600	96,500	24,211,425	159.717	33,511,581
West engine	4	21	25	9,765	10,000	9,800	19,800	3,134,565	158.201	21,956,583
Both engines	25	187	45	85,190	30,900	85,400	116,300	27,345,990	159.604	31,296,022

HENDERSON DUPLEX ENGINE, RECORD FOR 1883.

[illegible]	[illegible]			COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and decimals.	Duty.
	Hrs.	M.	Strokes.	Raising Steam.	Pumping.	Total.			
[illegible]	[illegible]	[illegible]	[illegible]	1,000	140,000	141,000	30,650,051	160.010	30,078,189
[illegible]	[illegible]	[illegible]	[illegible]	1,000	1,302,100	1,303,100	158,009,500	158.200	20,088,189
[illegible]	[illegible]	[illegible]	[illegible]	1,000	901,000	902,000	130,001,004	157.810	31,307,220
[illegible]	[illegible]	[illegible]	[illegible]	3,100	910,100	913,000	137,110,371	158.977	30,921,510
[illegible]	[illegible]	[illegible]	[illegible]	13,000	3,277,100	3,260,100	465,000,507	158.077	30,870,743

WORTHINGTON DUPLEX ENGINE NO. 1, RECORD FOR 1883.

MONTHS.	PUMPING.				COAL CONSUMED.			Gallons of Water Pumped.	Height in feet and decimals.	Duty.
	Days.	Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	31	737	50	340,328	2,000	663,000	665,000	216,583,900	159.473	47,754,516
February	28	672		372,988	2,000	737,100	739,100	231,252,500	159.062	41,030,080
March	31	744		397,114	2,000	749,000	751,000	246,210,690	158.074	43,479,392
April	14	298	45	128,254	....	240,000	240,000	79,517,480	158.106	43,843,007
May	31	734	..	311,456		558,100	558,100	193,102,720	157.841	45,082,642
June	30	720	..	324,880	2,400	625,300	627,700	201,425,000	157.430	42,257,676
July	31	744		357,097	3,200	755,100	758,300	227,000,140	157.398	39,500,508
August	31	743	10	383,083	800	654,600	655,400	237,889,680	157.715	47,884,703
September	30	719	10	335,958	2,200	574,400	576,600	208,293,980	157.709	47,055,473
October	14	332	45	144,187	..	258,800	258,800	89,395,940	157.113	45,390,384
November	18	382	45	162,556		320,700	320,700	100,784,720	158.055	40,785,852
December	31	744	..	361,593	2,000	669,800	671,800	224,187,690	158.193	44,158,418
Totals and averages	320	7572	5	3,630,104	16,600	6,752,500	6,769,100	2,256,244,450	158.099	44,071,290

WORTHINGTON DUPLEX ENGINE NO. 2, RECORD FOR 1883.

Months.	[illegible]				Coal Consumed.			Gallons of Water Pumped.	Height in feet and decimals.	Duty.
	Days.	Hrs.	Min.	Strokes.	Raising steam.	Pumping.	Total.			
January	[illegible]	[illegible]		[illegible]		654,900	654,900	235,102,900	159.521	47,958,847
February	28	[illegible]		[illegible]		708,500	708,500	228,344,140	159.002	42,880,874
March	[illegible]	[illegible]		[illegible]	1,000	662,900	663,900	233,502,080	158.658	44,070,815
April	[illegible]	[illegible]		[illegible]		354,800	354,800	121,535,000	158.391	45,243,880
May	[illegible]	[illegible]		[illegible]		537,000	537,000	180,215,320	157.825	46,517,102
June	[illegible]	[illegible]		[illegible]		617,200	617,200	204,483,440	157.530	43,650,912
July	[illegible]	744		[illegible]		621,100	621,100	217,057,040	157.308	45,781,000
August	[illegible]	744		361,105		652,400	652,400	223,022,900	157.247	45,146,380
September	30	720		310,540		560,200	560,200	192,538,520	158.014	44,709,711
October	31	744		317,154		588,700	588,700	190,821,480	157.873	44,151,157
November	30	720		270,311		518,800	518,800	171,812,820	158.198	44,164,041
December	31	744		360,470	....	605,800	605,800	221,010,080	158.184	45,998,407
Totals and averages	365	8760		3,982,214	1,000	7,158,200	7,159,200	2,487,072,080	158.158	45,051,793

SCHEDULE SHOWING THE DISTRIBUTION OF WATER FOR EACH DAY AND MONTH IN THE YEAR 1883.

MONTHS.	Gallons of water pumped by Cornish Engine.	Gallons of water pumped by Henderson Engine.	Gallons of water pumped by Worthington Engine No. 1.	Gallons of water pumped by Worthington Engine No. 2.	GALLONS DISTRIBUTED.			
					Per month.	Average per day.	Each inhabitant per day.	Each consumer per day.
January	21,306,375	29,659,981	216,583,360	235,162,900	502,712,616	16,216,536	86.26	156.00
February	2,905,050		231,252,560	228,344,140	462,501,730	16,517,920	87.86	158.90
March			246,210,680	233,562,680	479,773,360	15,476,560	82.32	148.97
April		188,898,590	79,317,480	124,535,060	392,751,130	13,091,704	69.64	126.02
May			193,102,720	189,215,320	382,318,040	12,332,840	65.60	118.71
June	505,575		201,425,000	204,483,440	406,414,615	13,547,154	72.06	130.40
July	2,628,990		227,600,140	217,057,040	447,286,170	14,428,586	76.75	138.88
August			237,889,600	223,922,300	461,811,900	14,897,160	79.24	143.39
September			208,293,960	192,538,520	400,832,480	13,361,083	71.07	128.61
October		120,091,062	89,395,940	196,821,480	406,309,082	13,106,745	69.72	126.16
November		127,419,274	100,784,720	171,312,820	399,516,814	13,317,227	70.84	128.19
December			224,187,660	221,016,980	445,204,640	14,361,440	76.30	138.24
Totals and averages.	27,345,990	465,960,507	2,256,244,480	2,437,972,080	5,187,432,657	14,212,144	73.60	136.80

SCHEDULE SHOWING THE TOTAL AND AVERAGE QUANTITIES OF WATER PUMPED EACH YEAR SINCE THE BEGINNING OF THE WORKS.

YEARS.	GALLONS DISTRIBUTED.				Per cent. of Increase.
	Per year.	Per day.	Each inhabitant per day.	Each consumer per day.	
1857	127,302,365	348,964	7.75	110.68	
1858 ...	142,135,434	389,467	8.27	98.44	11.79
1859	196,254,000	537,707	11.21	91.27	38.45
1860	260,220,354	710,984	14.11	105.57	32.67
1861	322,175,122	882,300	16.22	114.30	23.81
1862	369,473,092	1,012,794	19.47	120.77	14.74
1863	420,790,873	1,152,873	20.37	117.34	13.89
1864 ...	475,114,225	1,300,858	21.06	123.90	12.14
1865	517,267,105	1,417,173	21.80	122.70	8.84
1866	587,572,220	1,609,239	22.35	124.28	13.55
1867	696,363,575	1,907,461	23.86	115.94	18.55
1868	768,746,575	2,106,265	24.77	116.18	10.40
1869	898,028,425	2,462,839	27.36	120.30	16.82
1870	1,126,228,700	3,086,138	30.80	113.20	25.25
1871	1,367,12[illegible]	3,7[illegible],407	[illegible]	124.80	[illegible]
1872	[illegible]	[illegible]	40.17	[illegible]	22.57
1873	[illegible]	[illegible]	[illegible]	[illegible]	21.85
1874	[illegible]	[illegible]	[illegible]	[illegible]	5.65
1875	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1876	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1877	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1878	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1879	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1880	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1881	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1882	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1883	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS, FOR THE YEAR ENDING 1883.

RECAPITULATION.

Pipe extension	$299,608 43
General repairs	10,484 77
Office and general expenses	25,909 18
Engine house expenses	36,196 30
Engine house repairs	1,326 26
Water meters	10,998 52
Fairmount reservoir	83,157 91
Kinsman street reservoir	25,340 95
New boiler house	21,279 28
New engines and boilers	11,532 89
Total	$525,834 57

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1902

ANNUAL REPORT

OF THE

Water Works Trustees

OF THE

CITY OF CLEVELAND,

For the Year Ending December 31, 1884.

CLEVELAND, O.:
[illegible] PRINTING COMPANY,
[illegible]

EXCHANGE 2 AUG 1904
AM. SOC. CIVIL ENGINEERS

TWENTY-NINTH

ANNUAL REPORT

OF THE

BOARD OF

Water Works Trustees

OF THE

CITY OF CLEVELAND, O.,

FOR THE YEAR ENDING DECEMBER 31, [illegible]

CLEVELAND, O.
PEERLESS PRINTING COMPANY
1885.

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.
1902

Trustees' Report.

REPORT OF THE TRUSTEES.

To the Honorable Mayor and City Council of Cleveland:

GENTLEMEN:—The undersigned, Board of Trustees of Water Works, respectfully submit the Twenty-ninth Annual Report, with the reports of the Secretary, the Superintendent and Engineer and the Engineer of Pumping Works.

From the Report of the Secretary, it will be seen that there has been a very gratifying increase in the receipts for water during the year just closed, amounting to nineteen thousand, three hundred and twenty-two dollars and thirty-eight cents.

The net revenue is two hundred and twenty thousand, seven hundred and twenty-five dollars and seventy-one cents, ($220,725.71) which is eighteen thousand dollars ($18,000) greater than the total revenue of four years ago.

The Secretary shows that nearly two-thirds (⅔) of the cost incurred in building, extending and maintaining the water works, has been paid, and that the net revenue of the department, if it could be applied to that end, and no further extentions or enlargements should be necessary, would wipe out the present debt in less than six years. From this showing, we feel justified in assuming that the bonds issued by your Honorable Body to finish the work now in progress, (which unless something unforseen occurs will be completed during the present year) will have been wisely invested.

The Report of the Superintendent and Engineer shows the progress made in the works of enlargement and the extension of the pipe system so fully in detail that we deem it only necessary to call your attention thereto.

The condition of the lake crib as shown in his report, is such that it would be imprudent to longer delay the work recommended therein, and plans are now being prepared that it may be pushed forward and completed as early in the season as practicable. We desire to call your attention to the fact that the high service pumping works and reservoir will be completed during the year, and that an opportunity will then be afforded to lay mains from Woodland Hills avenue into the central portions of the city for a gravitation supply of water for fire protection.

The head of water in the pipes at the centre of the Public Square would be 245 feet, with a pressure of 105 pounds per square inch. Branch pipes have been put in the main along Woodland Hills avenue at the more important avenues leading to the centre of the city, preparatory to laying such fire protection mains, if you should deem it advisable to do so at any time in the future.

The Superintendent and Engineer calls attention to the enormous waste of water during protracted periods of cold weather in winter, and dry, hot weather in summer, and contrasts the daily consumption by our own people with that of several eastern cities, in which meters are freely used, showing a condition of wastefulness that calls for vigorous measures for its abatement.

The startling fact that at the present rate of increase the full capacity of the lake tunnel and the present machinery will have been reached in five years, is one to which the citizens of Cleveland, particularly those among them who are water takers contributing to this wastefulness, should take heed. It is not pleasant to contemplate the possibility of being called upon so near in the future for an appropriation of a million dollars for further enlargement of the works, when it is shown that one-half of the water now pumped would suffice for all necessary purposes and thus double our capacity and put off the time for further enlargement.

We do not wish to restrict the free use of water, for any useful or necessary purpose, but the evils of wanton, criminal wastefulness, has reached such a stage, that we will be compelled to adopt radical measures for its suppression and those who are careful and economical in their use of water must not feel offended if their homes are invaded by the inspectors of the department, in search of improperly placed pipes, and leaky or defective water fixtures, for it is our purpose to make an effort to correct the evil.

The plan adopted by the water department of the city of Erie as outlined in the acompanying report, combined with the meter system will, we believe result in great saving, if adopted and rigorously carried out.

Signed,
PERRY W. RICE.
Wm. H. LUTTON.
EDWIN HART.

REPORT OF THE SECRETARY.

OFFICE SECRETARY WATER WORKS.
CLEVELAND, OHIO, Feb'y 6, 1885.

To the Honorable Board of Trustees of Water Works:

Gentlemen:—I have the honor to respectfully submit the Annual Report showing in the abstract. the business of this office, for the year ending December 31, 1884.

RECEIPTS.

Water rents from water measured	$ 117,188 47	
Water rents from assessments	166,343 19	
Water rents from miscellaneous sources.	10,496 99	
Water rents from ferrules, 2,141 connections @ $3.00	6,423 00	$300,451 65
Bonds sold Cleveland Sinking Fund Commissioners.		350,000 00
On account of construction.	10 00	
On account of pipe extension	1,339 48	
On account of high service reservoir	51 00	
On account of high service engine	9 00	
On account of water meters	881 78	2,291 26
On account of office and general expense	102 25	
On account of general repairs	150 75	
On account of engine house expense	93 00	346 00
Cash in City Treasury, January 1884.	2,160 86	
Cash in office January 1, 1884	1,619 95	3,780 81
Total		$656,869 72

DISBURSEMENTS.

On account of pipe extension	$268,048 30	
On account of Fairmount Reservoir	117,302 13	
On account of high service reservoir	88,200 06	
On account of high service engine house	22,149 84	
On account of high service engine	9,322 91	
On account of Worthington engine No. 3, and boilers	45,772 11	
On account of Norman street sewer.	3,798 80	
On account of construction	204 50	
On account of water meters	10,429 98	$565,228 11
On account of ferrules, cost of tapping 2141 connections	2,955 10	
On account of returned water rent	1,108 95	4,059 05
On account of office and general expenses	23,345 44	
On account of general repairs.	6,040 32	
On account of engine house expenses	43,046 22	
On account of engine house repairs.	3,580 91	76,012 89
Cash in City Treasury, January 1, 1885	10,308 93	
Cash in office January 1, 1885.	1,265 74	11,574 67
Total		$656,869 72

From the above is obtained the following:

Received for water	**$300,451 63**	
Less paid for tapping and returned water rent	**4,059 03**	**$296,392 60**
Bonds		**350,000 00**
Balance cash January 1, 1884		**3,780 81**
Total		**650,173 41**
Disbursed for running expenses and repairs	**75,666 89**	
Disbursed for additions to water works plant	**562,931 85**	**638,598 74**
Balance cash on hand January 1885.		**11,574 67**
Total		**$650,173 41**

The net earnings of 1884 are	$220,725.71.
The net earnings of 1883 are	201,403.33.
Increase in favor of 1884	19,322.38.
At the same rate of increase the gross receipts for water in 1885 will be	320,000.00.
Estimated expenses 1885	80,000.00.
Leaves to apply on new work	240,000.00.

LEDGER BALANCES.

December 31, 1884.

Face of Ledger.	Debit.	Face of Ledger.	Credit.
Cash .	$ 1,865 74	Water rent	$1,821,723 38
City Treasurer .	10,308 98	City of Cleveland	48,071 26
Interest .	140,802 09	Bonds outstanding.	1,500,000 00
Construction. .	3,707,928 22	Bonds redeemed.	925,000 00
Fairmount reservoir ...	241,104 54		
High service reservoir. .	112,490 01		
High service eng'n house	22,149 84		
High service engine	9,218 91		
Water meters	48,426 86		
Total ..	$4,294,794 64	Total ..	$4,294,794 64

The construction account, as shown in the Ledger is made up of the following parts :

		Per Cent.
Franklin street Reservoir and Grounds, six acres land and Reservoir, capacity 4,000,000 gallons.	44,[illegible] 23	[illegible]
Engine house grounds old River street and old river bed, four acres.	34,[illegible] 45	[illegible]
Two engine houses with room for six pumping engines of a combined daily capacity of 70,000,000 gallons	[illegible] 47	[illegible]
Six pumping engines, combined daily pumping capacity of 48,000,000 gallons	[illegible] 25	[illegible]
Lake Crib and Tunnel, [illegible] feet long, 5 ft. 4 in. diameter from crib to engine houses, 40,000,000 gallons daily delivering capacity	[illegible] 51	[illegible]
[illegible] miles mains.		
[illegible] miles distributing pipes.		
[illegible] fire hydrants.		
Constituting the pipe system	2,[illegible] 07	[illegible]
[illegible] water meters set on services in good repair and protected from frost.	[illegible]	[illegible]
Fairmount storage reservoir, [illegible] gallons capacity, in progress of completion	241,204 54	[illegible]
High service reservoir, [illegible] gallons capacity, in progress of completion	112,[illegible]	[illegible]
High service engine house and engine in progress of completion	21,563 75	0.38
Total	[illegible]	100

[illegible] represented by the bonds [illegible] which taken [illegible] per cent of [illegible]

[illegible] to the sum [illegible] have been [illegible] interest, and [illegible] the depart- [illegible]

The bonds outstanding and the interest on the same:

$400,000.00	7 per cent. due May 1, 1892, interest	$28,000 00
200,000.00	7 per cent., due May 1, 1898, "	14,000 00
200,000.00	6 per cent., due Oct. 1, 1896, "	12,000 00
100,000.00	3 65-100 per cent., due Sept. 1, 1902, interest	3,650 00
100,000.00	4 per cent., due Sept. 1, 1908, interest	4,000 00
500,000.00	6 per cent., due Sept. 1, 1897, interest	30,000 00
$1,500,000.00	Total interest	$91,650 00

The interest is and has been paid from the general interest fund of the city with the exception of the amount above referred to, in lieu of which the water department has purchased, set and maintained, over 1700 fire hydrants furnished water for Public Schools, Engine Houses, Workhouse, Police Stations, Parks, for Puddling streets, for Hospitals, Orphan Asylums and all institutions of a purely charitable organization and other uses as the city has required.

The following is a detailed statement of receipts from miscellaneous sources as classified in the third and fourth items in the outside column of receipts, first page of my report:

1894.				
January	16,	A. B. Perkins, elevator connections	$ 53 36	
	16,	A. B. Perkins, enlarging connection	69 27	
	17,	American Lubricating Oil Co., laying 4 in. pipe	239 15	
				361 78
Febru'y	12,	G. M. Rackliffe, 3,900 lb. old brass at 10½c	409 50	
	25,	G. M. Radcliffe, 2,000 lb. old grate bars $10 per ton	10 00	
	25,	G. M. Radcliffe, 4,000 lb. No. 2, scrap $15 per ton.	30 00	
				449 50
March		A. D. Cannon, lumber, high service reservoir	35 00	
		A. F. Strater, 2 in. Worthington meter	53 00	
				88 00

April	1.	V. C. Taylor, Rent of rooms, Cushing block	[illegible]	
		A. F. & H. Strater, 2 in. connection, Bank street	[illegible]	
		A. F. & H. Strater, 1 and 2 in. connection Bank St.	[illegible]	
		James Merrick, for stone, Woodland Hills avenue	[illegible]	
		James Saburn, for stone, Woodland Hills avenue	[illegible]	
	25.	Thos. Arworthy, two 2 in. Worthington meters	[illegible]	
				[illegible]
May		Same, eighty-one loads stone from Woodland Hills av.	[illegible]	
		A. J. Ruttner, one cylinder valve box	[illegible]	
		E. Chadwick, Esq., one ¾ in. water meter	[illegible]	
		A. F. & H. Strater, one piece 14 in. pipe.	[illegible]	
		A. F. & H. Strater, connection, Lower Reservoir	[illegible]	
		Peter King, old stone from engine house	[illegible]	
				[illegible]
June		Samuel Wagoner, 7 loads stone from Woodland Hills	[illegible]	
		E. J. Fisher, Stone from Woodland Hills ave	[illegible]	
		Same, old lumber sold, High Service Reservoir	[illegible]	
		W. Young, stone, Woodland Hills ave	[illegible]	
				[illegible]
July		[illegible]	[illegible]	
		[illegible] connection, [illegible] street	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
				[illegible]
[illegible]		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
				[illegible]
[illegible]		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
		[illegible]	[illegible]	
				[illegible]

October	John Cary, stone from engine house...	8 00	
	J. Herig & Son, 4 in. fire connection, Parkman street.	52 75	
	Meriam & Morgan, 3 in. connect'n to pipe in Canal St.	64 53	
	John Whitelaw, appropriation fee.........	75	
			126 03
November,	A. Bradley, use of pumping house dock, winter '83-84	40 00	
	Geo. Schmitt, for old carpet.	2 00	
	C. & P. R. R., to correct error in freight charges......	69	
	Standard Oil Co., one 4 inch fire hydrant...	38 00	
	Standard Oil Co., one 2 inch Worthington meter.....	53 53	
			134 22
December,	L. R. Roberts, connection for school building...	13 66	
	C. E. Gehring, 2 inch connection Freeman street......	9 19	
	J. A. Vincent, 4 inch elevator connection Water street	81 64	
	A. F. & H. Strater, connection Hickox street.	19 89	
	White Sewing Machine Co., 3 in. connection Canal St.,	81 14	
			205 52
			$2,687 96

The following is a statement of the receipts for water from the beginning, also the running expenses and repairs, which taken from the total collections, corresponds with the water rent account, as shown in the Ledger.

Years.	Receipts for Water.	Running Exp's.	Repairs.	Receipts Less Expense and Repairs.
1856 to 1859	34,325 78	29,845 49	2,896 05	1,085 42
1860 "	16,798 80	7,088 90	1,734 25	7,878 65
1861 "	17,097 85	7,768 26	1,350 94	7,977 16
1862 "	22,730 58	5,096 19	1,391 29	18,858 05
1863 "	29,421 30	10,011 86	935 54	12,578 90
1864 "	35,390 19	15,573 26	1,958 49	17,862 74
1865 "	40,385 01	17,340 35	1,292 21	22,136 34
1866 "	45,365 70	14,277 18	5,818 77	22,367 90
1867 "	51,882 42	14,396 06	2,085 79	32,990 60
1868 "	57,297 96	17,304 32	3,068 43	36,340 28
1869 "	62,906 72	15,990 19	3,590 36	40,080 08
1870 "	70,417 [illegible]	19,732 [illegible]	9,822 96	40,962 95
1871 "	90,487 [illegible]	25,382 [illegible]	10,157 39	42,949 95
1872 "	[illegible]	[illegible]	[illegible]	54,535 22
1873 "	[illegible]	[illegible]	[illegible]	[illegible] 62
1874 "	110,48[illegible]	[illegible]	[illegible]	57,942 30
1875 "	[illegible]	[illegible]	[illegible]	42,305 71
1876 "	[illegible]	[illegible]	[illegible]	73,487 42
1877 "	[illegible]	[illegible]	[illegible]	81,541 96
1878 "	[illegible]	[illegible]	[illegible]	[illegible]
1879 "	[illegible]	[illegible]	[illegible]	[illegible] 31
1880 "	[illegible]	[illegible]	[illegible]	141,47[illegible] 08
1881 "	[illegible]	[illegible]	[illegible]	[illegible]
1882 "	[illegible]	[illegible]	[illegible]	[illegible] 08
1883 "	[illegible]	[illegible]	[illegible]	207,40[illegible]
1884 "	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	$[illegible]	$[illegible]	$[illegible]	$[illegible]

Permit me to call your attention to an evil, which in my opinion calls for an immediate remedy. That is, the enormous waste of water in the winter, by persons who from poor plumbing are obliged or think it necessary to waste water to keep pipes from freezing.

We have rules and regulations governing plumbers, a close application of which ought to afford sufficient protection, but the difficulty lies I think in not holding the plumbers to a stricter accountability.

There should be some person employed by you, to supervise all plumbers and inspect their work, as much for the protection of the water taker as for the department.

He should know what constitutes good plumbing. He should see that pipes on the premises and inside the building are laid at proper depths and protected in running through exposed places, that no hydrants are set over catch basins connected with sewers, and upon other defects which do not now occur to me, he should be thoroughly informed.

I am of the opinion that an inspection of plumbing in every place in the city where water if not measured would result in much good.

The person whose water is measured complains loudly of the injustice that allows his neighbor whose water is not measured to waste as much as he pleases for a nominal sum while he is made to pay largely for so doing. This is an argument I hear daily, as do you at nearly all of your meetings, and probably on the street and at your places of business and doubtless you feel the force of the argument as I feel it.

I imagine that in discussing the question, the remedy that I have proposed or some better one will suggest itself.

In conclusion, it seems proper to allude briefly to the death of Walter Blythe, which occurred August 19,

1884. Mr. Blythe served one full term and after an interval of a few years, was again chosen a Trustee of Water Works and was serving the last year of his term as your President.

The resolutions unanimously adopted by the joint meeting of your Board and its officers, August 30, and by the Hon. City Council at its first meeting after his decease, pay tributes to his memory in fitting terms.

All of which is respectfully submitted.

WILLIAM A. MADISON,

Secretary.

Superintendent's Report.

REPORT OF THE
SUPERINTENDENT AND ENGINEER.

To the Board of Trustees of Water Works:

GENTLEMEN:—The Twenty-ninth Annual Report, upon the condition and operations of the Water Works is herewith respectfully submitted.

LAKE CRIB.

The weakness developed in this structure since the date of my last Annual Report, prompts me to call your attention again to the necessity of rebuilding the superstructure during the coming summer.

The expenditure for labor and materials for strengthening that portion of the building above the water line was $295.06. The rapid decay of the hemlock timber forming the outer walls, has impaired its strength to such an extent that nothing short of rebuilding will now make it safe; while it passed through the year without material injury it has, nevertheless been a source of constant anxiety, particularly so, during stormy weather.

TUNNEL.

This part of the work has continued to serve its purpose without interruption and is doubtless in good condition. On the morning of January 4th, 1885, there was a partial obstruction by anchor ice, to the flow of water through the inlet in the crib, this was soon removed by the keeper after notice reached him.

The temperature of the air and water was just at the freezing point at the time interruption was first observed, but that of the air had been lower in the night. There was no ice on the lake.

It is suggested that when the crib is rebuilt, the inlet on the south side now obstructed with rip-rap stone, be opened and made available, thus reducing the flow of the current, and the danger of stoppage by ice.

BUILDINGS.

The west wing of the north engine house, formerly the boiler room for the west Cornish engine, has been fitted up in a plain but substantial manner for the new ten million gallon Worthington engine.

The north-west corner of this room had settled to such an extent that large cracks opened in the north and west walls, these were taken down, and the opening afforded a convenient inlet for material for the engine and foundations, the walls were rebuilt after the engine was in place and have not shown any signs of settlement since.

No work has been done to the room in the north building, from which the Cornish engines were removed except to place a temporary floor over the pits where the engines stood, and to put a roof on the brick part of the old stand-pipe tower.

The room thus vacated is of sufficient size to contain a pair of engines having a capacity of at least thirty million gallons per day or nearly four times that of the Cornish engines. Before it can be used, however, some plan for conveying water from the tunnel, to the pumps must be devised and carried out.

The aqueducts now leading to the different pumps will be taxed to their full capacity, whenever it becomes necessary to use all the present machinery at the same time; knowing that to be true it would be folly to make connections with either of them for the purpose of supplying other pumps.

Two plans have been suggested for procuring water for the pumps that must be placed in this room in the near future. One contemplates carrying a suction pipe to the east shaft of the land tunnel; for the other, the most difficult one to carry out, it is proposed to sink a well, in the engine room, down to hard clay, and from its bottom drive a tunnel, about one hundred and twenty feet in length, to the shaft above mentioned, entering it at a depth of about forty-five feet below the water line.

HIGH SERVICE PUMPING STATION.

Late in June proposals were received for building the foundation for the high service pumping house, engines, boilers, chimney and stand-pipe at the intersection of Norman street and Woodland Hills avenue.

The work was awarded to Mr. David Robertson, the lowest bidder, at a price based upon the quantities approximated from the plans, of $24,705.98.

By the terms of the contract it was to be completed by December 1, but on account of delay in receiving materials, and the early setting in of cold weather, the exterior walls above the ground line are not all finished there being about three weeks work remaining to be done. The delay however, has not resulted in any inconvenience to the Water Works: the work of erecting the engines and placing the boilers has been prosecuted by the contractors with no serious interruptions, the masonry on which they stand being all in place.

The inside dimensions of the buildinge are as follows: engine room 43x51 8-12 feet and 50 6-12 feet high to cornice, boiler room 49x63 feet and 24 feet high to cornice.

There are two rooms between the engine room and boiler room, one for an office, and the other a work shop each 16 3-12x13 4-12 feet. The base of the stand-pipe tower will be 25x25 feet with walls 4 feet thick from ground line to cornice line of engine room, from where it tapers to 12 inches in thickness at the top.

The height of the stand-pipe proper will be 205 feet and of the tower to top of peak 239 feet.

The chimney will be 140 feet high from the ground line with a base 15x18 feet.

The foundation of the whole structure rests on shale rock.

MACHINERY.

The ten million gallon Worthington engine, contracted for in 1883, has been completed and accepted. It is in every respect equal and in some of its details superior to the two others of the same kind. It will be seen by the accompanying table that the duty of this engine, for the time it has been in operation, exceeds that of any of the others.

The report of Mr. Doty, Engineer in charge of the pumping works, which is herewith submitted, reviews the condition of the machinery, boilers, etc., under his care, so fully, that I can only add my recommendation to his suggestion, that provision should be made in the near future, for a pair of large engines, to be placed in the room made vacant by the removal of the Cornish engines. The rapid growth of the city and increase in the consumption of water makes it necessary to keep in readiness for service a surplus pumping capacity.

I also join him in his recommendation to purchase machinery and tools for the now vacant work shop.

WEST SIDE RESERVOIR.

No work has been necessary on the Franklin street reservoir beyond the usual care bestowed by the keeper, such as cutting the grass and keeping the walks and fences in repair.

MAIN PIPES.

The main pipe, 36 inches in diameter, leading from Willson avenue east through Quincy street to Fairmount street reservoir, has all been laid and connections with both basins have been completed.

The total length of 36 inch main laid during the year including 136 feet of extra heavy pipe for inlet under the embankment in the south basin of reservoir was 5632 feet.

Of thirty inch pipe the length laid during the year was 14,992 feet, of this length 3,974 feet was laid from Woodland Hills avenue east through Kinsman street and the Warrensville road to and into the high service reservoir, 305 feet of this, under the south embankment is extra heavy laid, as in the lower reservoir, on brick piers, 207 feet was laid at the West Side pumping works to connect the mains leading from the two Worthington engines in the north engine house, the remainder 10,811 feet was laid in Woodland Hills avenue between Fairmount reservoir and Union street, including the outlet pipe from the north basin.

The length of 24 inch pipe laid was 3,955 feet, of this 2,814 feet was laid in Woodland Hills avenue, from Union street south to Way street, the balance is laid in Fairmount reservoir as waste and overflow pipe.

Of 20 inch pipe, branches were laid north and south from the 36 inch main in Quincy street at Bolton avenue and north at Doan street; the length of these branches is 93 feet, 132 feet was laid as a waste and overflow pipe under the east embankment of the high service reservoir.

A pipe of the same size was laid in Woodland Hills avenue from Way street south to Harvard street, a distance of 2,540 feet, making a total length of 2,765 feet of 20 inch laid during the year.

Of 16 inch pipe, 1342 feet was laid in Woodland Hills avenue south from Harvard street to Miles street, and branches of the same size were laid from Woodland Hills avenue main west, as follows: At South Woodland, Kinsman, Harvard and Miles streets, having an aggregate length of 120 feet, making a total of 1,462 feet of 16 inch in 1884.

The total length and cost per foot of main pipe laid from 16 inches to 36 inches in diameter, is as follows:

36 inch,	5032	feet, cost per foot..........	$10 15
30 inch,	14992	feet, cost per foot..........	7 20
24 inch,	3955	feet, cost per foot..........	4 54
20 inch,	2765	feet, cost per foot..........	3 77
16 inch,	1462	feet, cost per foot..........	2 91

28,206 feet = 5 miles, 1806 feet.............

I would again recommend the laying of a 30 inch main from the number 3 Worthington engine through Taylor, Harbor and Randall streets to Lorain street, with branch in Bridge street to Kentucky street, to connect with the main of that size running east in Bridge street. This pipe is necessary for the better supply of that portion of the city through which it would pass and should as soon as possible be extended south to Clark avenue, whence in time it would be laid easterly through Clark avenue to Broadway and Willson avenue, thence north to the intersection of Willson and Scovill avenues where it would connect with a branch, already laid, from the 36 inch leading to Fairmount reservoir, forming eventually another feeder to that main.

A 20 inch pipe should be laid in Union street from Woodland Hills avenue westerly to a point near Axtell street in the High Service District, and another of 16 inches diameter should be laid in Harvard street from Woodland Hills avenue to Broadway, from these two mains, lateral pipes for distribution could be laid that would for the present supply all the iron mills and oil refineries, as well as afford a supply for domestic use and fire protection.

I would also recommend that a 16 inch main be laid in Forest street, from Scovill avenue south to Croton street, from whence a 12 inch pipe should be extended to Broadway, for the purpose of giving a better supply of water to the distributing pipes it would cross as well as act as a feeder to that part of the Broadway pipe where the greatest quantity of water is now used.

There have been two leaks in the 30 inch mains, caused by cracked pipes, one at the intersection of Brownell street and Euclid avenue, the other at the foot of Division street hill. Another similar leak occured in the old twenty-four inch pumping main at the pumping works. All of them were repaired by inserting new pipes.

DISTRIBUTING PIPE.

The quantity of distributing pipe laid during the year, while not as great as that laid in 1883, was considerably above the average for the past ten years.

Of the different sizes up to and including twelve inch there was laid 15 miles 1441 feet, making a total length of that class of pipe now in use of 175 miles 2224 feet, which added to the main pipe gives a total of 196 miles 986 feet of all sizes.

In addition to the pipe laid, 1 mile and 88 feet was relaid, and 3 miles 4,576 feet was lowered, attached to which were 438 service pipe connections, measuring 1 mile 4,979 feet, all of which were lowered to a depth beyond the danger of frost.

STOP GATES.

The increase in the number of stop gates for the year was 408, of these 37 were in main pipes and 371 in distributing pipes and fire hydrant branches, 27 old ones were taken out and replaced by others, either on account of breakage or to increase the size

The whole number now in use, of all sizes, is 3,574; of these 119 are in main pipe lines above 12 inches in diameter.

FIRE HYDRANTS.

The whole number of public fire hydrants in use at this time is 1706. Of these 205 were added during the past year, and 19 have been taken out and replaced with larger ones.

Under authority given me by a resolution of your Board, adopted early last year, I have increased the number of fire hydrants wherever any changes have been made in the pipe system in the more thickly populated and business districts of the city. I have also increased the number on all new lines, at least twenty-five per cent.

The tables appended hereto give information in detail of all the work described above.

SERVICE CONNECTIONS.

The number of all sizes of new service connections made with the distributing pipes was 2111, an increase of 239 over the number added in 1883. The total number of service connections made since the works were built is 18,475. Of these 649 are abandoned or turned off for non-payment of water rent, 846 are laid only to the curb line of the street and 17 have been abandoned, the ferrules withdrawn and the openings plugged, leaving the number in use at the end of the year 16,963.

CONNECTIONS.

Size.	Made Previous to 1884.	Made in 1884.	Total.
⅝ inch	15,440	2,031	17,471
¾ inch	452	40	492
1 inch	141	1	142
1¼ inch	14	....	14
1½ inch	33	6	39
2 inch	132	15	147
2½ inch	3	..	3
3 inch	61	7	68
4 inch	86	10	96
6 inch	2	1	3
Total	16,364	2,111	18,475

Turned off for non-payment of rent, or abandoned	649
Not extended beyond curb line	846
Abandoned and openings plugged	17
Total	1,512
Number in use December 31st	16,963

WATER METERS.

The increase in the number of meters in use was 137, of hydraulic elevators 6 and water motors 1. These are all provided with registers that indicate the quantity of water used.

The total number of meters in use is.....	986
The total number of elevators in use is...	66
The total number of water motors in use is	5
Total devices for measuring water.....	1,057

METERS IN USE.

Name of Meters.	¾ in.	1 in.	1 ½ in.	2 in.	3 in.	4 in.	Total.
Worthington Piston......	478	251	88	90	47	18	972
Ball and Fitts Rotary......	2	....	....	1	1	....	4
Ball and Fitts Piston......	1	....	....	....	....	......	1
Crown Rotary.............	1	7	....	....	1	....	9
Totals..................	482	258	88	91	49	18	986

The number of gallons of water measured by meters hydraulic elevators and water motors was 1,136,268,848 or 3,104,560 per day, an increase over the previous year of 170,100 gallons per day, or 62,256,600 for the year.

DISTRIBUTION.

The quantity of water pumped during the year was 5,990,378,137 gallons, an increase over the year 1883 of 802,945,480 gallons.

The daily average for the year was 16,367,153 gallons, being an increase of 2,155,007 over the previous year.

The rate of increase was 15.47 per cent.

The cost of pumping each million gallons 100 feet high was $4.98.

The large increase in the quantity of water pumped can be accounted for, in part, by a leak in the 16 inch main, crossing the river at Ohio street, which had been running for an indefinite time, until discovered late in November.

That the leak is a large one there can be no question as the water comes to the surface of the river with strong force from a depth of 16 feet. The season being so far advanced no examination has yet been made to determine its character or extent. The gates on each side of the river were closed as soon as the leak was discovered and no inconvenience to water takers has been reported, the pipe being amply fed on both sides of the river by the 30 inch main.

FAIRMOUNT RESERVOIR.

Work on this reservoir has progressed in a satisfactory manner. The earth work in the embankments is nearly completed, the only work remaining to be done is to trim them to line and fill the top where worn away by teams, the soiling and seeding on three of the sides has been done, and the stone steps on the Woodland Hills avenue side are in place.

The waste pipe and drainage conduit are both completed, and the overflow pipe is laid to near the water line ready for the branches that will connect both basins with the waste pipe.

The puddle lining and concrete bottom in the south basin is completed, the puddle lining of the slopes is carried more than half way to the top, and the paving reaches to an average heigth of about seven feet. For the protection of the concrete, during the winter, the gates in the inlet main were opened and the bottom covered with water to a depth of three and a-half feet.

The excavation in the north basin is nearly to grade and the bottom covered with clay for puddle, which by the action of the winter frost and rains will be in the best possible condition for working in the spring.

Should nothing unusual occur, this work should be fully completed by September next.

The amount paid the contractors for work to December 31, is $160,521.38.

HIGH SERVICE RESERVOIR.

It is expected that this reservoir will be fully completed by June first. The embankments are up to grade with the exception of the top gravel walk, the outer slopes are trimmed to line and the soiling put on. All the pipe connections are made excepting the overflow, the castings for which are on the ground and can be put in place in three days, the ballast is nearly all in place, the concrete bottom is completed and the paving done to within about twelve feet of the top. About three feet of water was pumped into this basin before winter set in, for the purpose of protecting the concrete from the action of frost.

The amount paid on this work to December 31, is $96,211.49.

The work on both reservoirs is now so far advanced that the fences, stair railing, embankment railing and bridges leading to the valve rods may be put under contract early in the spring.

The accompanying abstract of expenditures gives the amounts in detail, under the different headings, of the sums expended, by the department, for all purposes for the year.

WASTE OF WATER.

The waste of water during freezing weather and its lavish use on lawns and for cooling premises during the summer months has become so excessive as to call for the adoption of vigorous measures for its suppression. The average consumption of water per day, last year was 16,367,153 gallons. The daily average for the month of January was 20,324,373 gallons, while that, for the month of April following was only 13,598 832 gallons.

The average daily consumption for the two spring months April and May, and the two Autumn months October and November was but 14,011,437 gallons, while the average consumption for the remaining eight months was 17,534,073 gallons per day.

The quantity used in the month of April includes a wastage of probably not less than 3½ million gallons per day, while for the month of January one-half of all the water pumped was wantonly allowed to flow back to the lake without having served any useful purpose.

If this wastefulness is permitted to go on unchecked, the people of Cleveland must be prepared for another expenditure of not less than one million dollars for a larger tunnel, more machinery and long lines of main pipes within the next five years, for, before the end of the year 1889, at the present rate of increase, which for the past two years has exceeded 15 per cent. per annum, the full capacity of the tunnel will have been reached and every engine at the pumping works will be crowded to its utmost capacity, with no reserve in case of accidents.

The average consumption per capita (exclusive of the eighteenth ward where no water pipe is yet laid) for the year 1883 was 75.60 gallons per day, and 82.66 gallons in 1884.

In the city of Providence R. I. where a little more than one half of the service pipes are metered, the consumption averages less than 35 gallons per capita per day. In that city the total number of services in use on the last day of September 1884 was 11,372 and the consumption of water for each service pipe per day for the three months ending on that date was 388 gallons, while in Cleveland the number of gallons, per service pipe, per day for the whole year was 935 or nearly two and one-half times greater than in Providence.

While we may never hope to reduce the consumption of water in Cleveland, with its broad sandy streets, wide lawns and large and numerous manufactories to as low figures as those named above, we may check the great waste and thus practically increase our capacity or in other words put off the time for enlargement for many years.

Many plans have been suggested and tried for the suppression of waste, but the only perfect one is the use of meters, the cost of this plan however, has heretofore been a bar to their universal introduction.

The cities of Providence and Pawtucket, R. I., Fall River and Worcester, Mass., and Manchester, N. H., come nearer to having a general meter system than any other cities in this country, and the result is alike satisfactory to consumer and water department.

The city of Erie, Pa., has adopted a different plan to accomplish the same result, the main features of which are a rigid inspection of all premises supplied with water, twice a year, and the classification of all plumbing as first-class or second-class, as the inspector may find it. In determining which class the plumbing of any premises may belong to, the inspector is not governed so much by the workmanship as by the arrangement of the piping with reference to its protection against freezing, and the means for closing the water off and draining the pipes. At the same time he instructs the occupants how to guard against freezing without allowing water to run. First-class plumbing is that which is so arranged that the water may be turned off inside of the premises, and the pipes all drained, or where there is no danger of freezing at any time, and is charged single rates for water. Second-class plumbing is such that the pipes cannot be drained or kept from freezing without permitting the water to run, and is charged double rates if not changed within a reasonable time after notice is given. The adoption of the system has reduced the quantity of water per capita so that no more is being pumped at this date than was required at the same time two years ago, notwithstanding a large increase in the number of water takers.

I believe that by combining the meter system with that adopted by Erie the quantity of water now pumped in Cleveland can be reduced one-half or that it may be made to supply double the number of water takers we now have without inconvenience to any one.

The approximate estimate of anticipated expenditures for the year 1885, for all purposes, is as follows:

Fairmount Reservoir, to complete..	$ 168,500
High Service Reservoir, to complete	40,000
High Service Engine House........	105,000
Cornish Engines, to erect..........	12,900
Main pipe..........................	50,000
Pipe for street distribution.........	135,000
Rebuilding Lake Crib, Superstructure.............................	25,000
Operating expenses and ordinary repairs...........................	80,000
Total estimated expenditure........	$ 616,400
Deduct estimated receipt for water.	320,000
Total amount of bonds to be issued.	$ 296,400

Respectfully Submitted,

JOHN WHITELAW,

Superintendent and Engineer.

CLEVELAND, OHIO,
February 6, 1885.

Report of Pumping Department.

REPORT OF

ENGINEER OF PUMPING DEPARTMENT.

To the Trustees of Cleveland Water Works:

GENTLEMEN:—The Engineer of the Pumping Department of the Cleveland Water Works would most respectfully submit the following Annual Report:

CORNISH ENGINES.

In accordance with the conditions of a contract with Chafer & Becker, the old Cornish engines have been removed from their long resting place in the north side Pumping House to the new High Service Station on Fairmount street, where they are now being erected.

In consequence of delays in building the foundation for these engines the specified time for completing the work as provided in the contract has passed, and the work is not nearly completed; however, the contractors have manifested a very commendable disposition to comply with both the letter and spirit of the agreement, and will, I believe, push the work forward with energy when circumstances will permit.

The present state of forwardness is about as follows: The six Cornish boilers are in place and the connections well under way. The base plates under columns and all the heavy castings built into the masonry are in place: also tank bottoms, suction pipes, valve chambers, air pumps and condensers. The progress made since starting the work of removal warrants us in concluding that early next autumn we shall see the engines ready for service.

HENDERSON ENGINES.

As contemplated in my last report, the south cylinder of these engines has been provided with new piston rings. the same as those in use in the north cylinder of the same engine. No further expense for repairs will be necessary during the coming year. These engines are held in reserve, consequently pump a comparatively small amount of water. They are in good repair.

NO. 1 WORTHINGTON ENGINE.

This engine has been in almost constant service since July 16, 1876, and has required very little repair, aside from the accident mentioned in my last report. At this date they are in good repair, considering the length of service rendered.

NO. 2 WORTHINGTON ENGINE.

This engine continues to merit our confidence, and is making a better record for herself than No. 1. as will be seen by reference to the annex tables. June 13th a slight mishap occurred. caused by carelessly drawing the screens in the aqueduct. A large quantity of fish passed into the suction pipe and choked the induction valves. causing a stoppage of about twenty-four hours and a slight expense for repairs. No further expense for repairs will be necessary the coming year barring accidents.

NO. 3 WORTHINGTON ENGINE.

March 20th we were instructed by Sup't Whitelaw to clear the west boiler house to make room for the new Worthington engine under contract. This work was done as speedily as possible. the foundations were at once put in. and on June 9th the engines were delivered at the Pumping Works. The work of erecting was pushed forward with energy. and on August 1st the engines were ready for steam. but owing to some delay in making connections with the delivery main. were not started until August 14. After the usual preliminary test of about two weeks. the engines were shut down for lagging and painting, which was completed in October, and the engines again started upon final test for acceptance. December 2nd a duty trial was made by the engineer in charge, and the engines proved beyond a doubt that all the conditions stipulated in the contract were fully met, showing a duty of 50,585,681 foot pounds.

ENGINE SUMMARY.

The west side Pumping Station contains four duplex pumping engines. With a combined capacity of 40 million gallons daily, with an average consumption of only 16¼ millions, there would appear to be ample margin for safety, but the fact that our minimum consumption is about 25 millions, forces upon us the conviction that our efforts should not be relaxed until the vacant space in the old north side building is filled with engines and boilers.

The district soon to be supplied by the high service system must be added to our present consumption, and will take at least five million gallons per day. This will bring our consumption up to thirty millions within the next year, without including the regular increase of about 15½ per cent. annually.

In view of the foregoing facts I would recommend that in the near future two fifteen million gallon pumps be provided and four additional boilers for the same. The room left vacant by the removal of the Cornish engines and boilers gives ample space for this addition to the works.

It has been apparent for some time that larger engines could be used to good advantage, and should be introduced at the earliest practicable opportunity. The cost of attendance is just the same for large or small engines, and this fact alone is sufficient to warrant their introduction. Many other reasons might be given, but they seem to me so apparent that I will not refer to them here, believing that you will concur in this suggestion.

BOILERS.

The Pumping Department has at this date nineteen boilers consisting of the following different kinds: Ten Marine, six Cornish, two Tubular, and one Portable, all in good repair, excepting two, which will need quite extensive repairs during the year. Four have received necessary repairs the past year.

Some expense has been incurred in connection with our boilers, experimenting with so-called smokeless furnaces. As yet we have not met with very gratifying success. We have hesitated about introducing any of the modern devices offered for sale, for the reason that none have been adapted to our style of boilers, and great expense would be necessary to introduce them. So far as I have observed none are giving entire satisfaction. Some are doing fairly well, but reduce the boiler capacity from twenty to twenty-five per cent., which would be a fatal objection to us. I appreciate the desirableness of making this matter a success, and shall keep steadily in view this most important question, and shall cheerfully comply with any suggestions from your honorable body.

MISCELLANEOUS.

Since my last report the west battery of boilers has been completed; the west wing of the old building has been converted into an engine room; the new Worthington engines have been erected; the Cornish engines have been removed, and a temperary floor constructed over the pits where they rested. One narrow guage railway has been changed to conform to the new boiler house, and other minor changes incident to the many improvements carried forward during the year.

The foregoing improvements and alterations have been made without interrupting the regular supply of water. The only interruption was caused by the bursting of the old 24 inch main in front of the engine house December 18, when the engines were all at rest forty-five minutes. During that time the water in the reservoir fell from twenty feet to thirteen feet.

RECOMMENDATIONS.

Five thousand dollars expended in tools for our machine shop would greatly facilitate our repairs and prove a saving to the department in this line of expense.

Schedule showing gallons of water pumped and coal consumed in pumping, percentage of coal consumed and water pumped by each engine, contract price of coal, coal consumed and cost of coal for raising one million gallons into Reservoir.

Engines.	No.	Water Pumped by Different Engines.	Pounds of Coal Consumed by Different Engines.	Per cent. of Water Pumped by Different Engines.	Per cent. of Coal Consumed by Different Engines.	Per cent. of Coal Consumed by Different Engines, Pumping 1,000,000 Gallons into Reservoir.	Contract Price of Coal.	Cost of Pumping 1,000,000 Gallons into Reservoir	Year.
Worthington	1	2,482,377,000	7,637,900	41.44	39.78	30.76	$1 65	$2 54	1884
Worthington	2	2,377,580,960	7,068,770	39.69	36.83	30.99	1 65	2 45	1884
Worthington	3	507,666,540	1,395,600	8.47	7.30	25.52	1 65	2 27	1884
Henderson	3	622,743,637	3,088,840	10.40	16.09	49.60	1 65	4 09	1884

Respectfully submitted,

R. DOTY,

Engineer in charge.

WORTHINGTON DUPLEX ENGINE NO. 1 RECORD FOR 1884.

Months.	Days.	Pumping			Coal Consumed.			Gallons of Water Pumped.	Height in Feet and Dec.	Duty.
		Hrs.	Mins.	Strokes.	Raising Steam.	Pumping.	Total.			
January	31	739	30	368,344	7,000	580,440	587,440	228,372,380	159.864	51,888,449
February	29	693	....	257,201	.....	482,760	482,760	159,464,680	158.709	43,851,911
March	28	641	45	317,256	.....	612,100	612,100	193,698,780	158.878	42,572,478
April	30	719	40	396,111	.....	627,400	627,400	202,166,880	157.444	42,441,786
May	31	744	......	355,429	3,000	696,200	699,200	220,205,980	157.899	41,479,746
June	30	696	......	370,469	.....	888,400	888,400	229,600,780	158.129	36,454,887
July	31	734	40	411,588	.....	766,000	766,000	255,147,300	158.064	44,207,667
August	23	546	....	317,162	.....	581,700	581,700	196,640,440	158.677	49,087,901
September	28	646	05	347,483	4,000	546,650	550,650	215,439,460	158.088	52,081,5·8
October	24	555	15	274,164	2,800	491,900	494,700	160,981,080	158.510	45,558,692
November	29	670	35	325,338	6,800	646,800	653,600	201,709,560	158.977	41,089,437
December	28	654	15	383,365	6,000	792,950	798,950	206,686,300	159.700	34,558,451
Totals and averages	342	7,982	45	4,003,850	27,600	7,008,300	7,687,900	2,482,887,000	158.580	43,111,843

WORTHINGTON DUPLEX ENGINE NO. 2 RECORD FOR 1884.

Months.	Date.	Pumping.			Coal Consumed.			Gallons of Water Pumped.	Height in Feet and Dec	Duty.
		Hrs.	Mins.	Strokes.	Raising Steam.	Pumping.	Total.			
January	31	744	......	383,656	....	736,750	736,750	287,866,720	159,554	43,090,061
February	29	696	......	293,312	....	567,200	567,200	181,791,440	158,568	42,510,244
March	27	629	......	310,842	....	506,100	596,100	192,722,040	158,425	42,811,235
April	30	720	......	331,897	....	665,500	665,500	205,776,140	157,444	40,722,042
May	31	744	......	356,410	....	676,100	676,100	220,974,200	157,338	43,014,861
June	28	647	30	340,917	....	789,100	739,100	211,368,540	158,250	37,856,148
July	31	744	......	396,630	....	659,400	659,400	245,910,600	158,054	49,301,684
August	31	744	......	401,412	....	676,500	676,500	248,875,440	158,560	48,793,841
September	30	719	30	371,250	....	685,850	685,850	230,175,000	158,970	48,136,233
October	31	739	45	342,318	....	572,450	572,450	212,237,160	158,484	49,150,186
November	15	303	55	143,707	....	247,850	247,850	89,098,840	158,861	47,769,569
December	14	319	30	162,557	17,000	278,970	295,970	100,785,840	159,993	45,544,171
Totals and averages	328	7,751	10	3,834,808	17,000	7,051,770	7,068,770	2,877,580,960	158,533	44,603,394

WORTHINGTON DUPLEX ENGINE No. 3, RECORD FOR 1884.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped.	Height in Feet and Dec.	Duty.
		Hrs.	Mins.	Strokes.	Raising Steam.	Pumping.	Total.			
August	10	211	45	112,900	8,000	236,800	244,800	69,606,780	158,908	37,795,469
September	3	70	...	39,811	....	66,000	66,000	24,872,820	158,563	48,977,954
October	9	193	20	85,580	.....	150,000	150,000	53,028,600	158,689	49,911,778
November	24	470	30	216,596	....	368,050	368,050	134,248,900	159,000	48,527,278
December	31	743	15	365,112	....	566,750	566,750	226,309,440	159,629	58,882,806
Totals and averages	77	1,688	50	818,817	8,000	1,387,600	1,395,600	507,606,540	158,940	43,363,703

HENDERSON DUPLEX ENGINE RECORD FOR 1884.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped.	Height in Feet and Dec.	Duty.
		Hrs.	Mins.	Strokes.	Raising Steam.	Pumping.	Total.			
January	28	656	40	299,480	....	881,700	881,700	168,815,560	159.678	24,812,970
February	29	696	......	279,333	....	725,640	725,640	152,706,151	158.908	27,985,782
March	20	467	45	230,037	1,000	567,900	568,900	125,830,239	158.658	29,330,455
June	24	255	40	136,065	40,000	309,200	349,200	71,427,553	158.448	28,245,135
July	22	214	50	113,623	44,000	284,000	328,000	62,151,781	158.182	25,069,170
August	9	67	45	86,060	18,000	100,200	118,200	19,724,830	159.602	22,275,675
September	10	82	5	43,873	5,000	112,200	117,200	23,998,531	159.783	27,364,447
Totals and Averages	142	2,440	45	1,138,471	108,000	2,980,840	3,088,840	622,748,637	159,037	26,818,650

SCHEDULE SHOWING THE DISTRIBUTION OF WATER FOR EACH DAY AND MONTH IN THE YEAR 1884.

Months.	Gallons of Water pumped by Henderson Engine.	Gallons of Water Pumped by Worthington Engine No. 1.	Gallons of Water Pumped by Worthington Engine No. 2.	Gallons of Water Pumped by Worthington Engine No. 3.	Gallons Distributed. Per Month.	Gallons Distributed. Average Per Day.	Gallons Distributed. Each Inhabitant Per Day.	Gallons Distributed. Each Consumer Per Day.
January	163,815,560	228,373,280	237,866,720		630,055,560	20,324,373	102.64	171.16
February	152,796,151	159,463,620	181,791,440		494,051,211	17,036,248	86.04	143.47
March	125,830,239	196,698,720	192,722,040		515,250,999	16,620,999	83.94	139.97
April		202,188,820	205,776,140		407,964,960	13,598,832	68.68	114.58
May		210,365,980	230,974,200		441,340,180	14,236,780	71.90	119.80
June	74,427,555	229,690,780	211,368,540		515,486,875	17,182,895	86.78	144.70
July	62,151,781	255,147,360	245,910,600		563,209,741	18,168,056	91.75	153.00
August	19,724,820	196,640,140	218,875,440	99,606,780	534,847,180	17,253,134	87.13	145.80
September	23,998,531	215,439,460	230,175,000	24,372,820	493,985,811	16,466,193	83.16	138.67
October		169,981,680	212,237,160	53,028,600	435,247,440	14,040,240	70.91	118.24
November		201,709,520	89,098,340	131,288,900	425,096,400	14,169,880	71.56	119.34
December		206,686,330	100,785,340	226,369,410	533,841,080	17,220,680	86.97	145.02
Totals and averages	622,743,637	2,482,387,000	2,377,580,960	307,696,540	5,990,378,137	16,367,153	82.66	137.83

SCHEDULE SHOWING THE TOTAL AND AVERAGE QUANTITIES OF WATER PUMPED EACH YEAR SINCE THE BEGINNING OF THE WORKS.

Years.	Gallons Distributed.				Per Cent. of Increase.
	Per Year.	Per Day.	Each Inhabitant Per Day.	Each Consumer Per Day.	
1857	127,262,265	348,664	7.75	110.68	....
1858	142,155,434	398,467	8.37	93.44	11.70
1859	198,284,090	518,107	11.31	91.27	39.45
1860	260,220,354	710,984	14.11	105.57	31 87
1861	322,175,022	881,599	16.32	114.50	23 81
1862	369,673,092	1,012,794	19.47	120.57	14.74
1863	420,790,875	1,152,875	20 97	117.54	12.83
1864	476,114,225	1,300,858	21.68	123.89	12.14
1865	517,261,005	1,417,153	21.80	122.70	8.64
1866	587,372,220	1,609,239	22 35	124.26	13.55
1867	696,339,375	1,907,861	23.85	115.98	18.55
1868	768,786,975	2,106,265	24.77	116.08	10.40
1869	898,936,425	2,462,839	27.36	120.20	16.92
1870	1,126,228,500	3,085,558	30.86	118.20	25.28
1871	1,367,621,100	3,746,907	35.68	124.90	21.43
1872	1,686,370,895	4,607,571	40 07	131.64	22.67
1873	1,869,768,835	5,095,230	43.06	137.71	10.85
1874	2,050,252,910	5,625,150	45 36	141.10	9.65
1875	2,216,775,816	6,073,358	44.00	136.65	8.12
1876	2,399,225,403	6,573,220	49.22	131.28	8.23
1877	2,820,326,074	7,726,920	55.91	142.24	17 55
1878	2,892,946,823	7,925,882	51.18	135.05	2.57
1879	3,155,271,981	9,466,498	62.69	145.61	19.43
1880	3,725,683,021	10,179,461	65.25	145.23	7.82
1881	4,847,209,363	13,280,025	76.76	162.34	30.10
1882	4,494,538,536	12,313,804	68.41	136.04	7.27
1883	5,187,432,657	14,212,144	75.60	136.80	15.41
1884	5,990,378,137	16,367,153	82.66	137.83	15.47

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884

Side.	Size.	Street	Between What Points.	Ft. Laid	Total.	Remarks.
North.	36 in.	Quincy	From 320 west of Bolton ave. to 36 inch curve in Woodland Hills ave	4,000		
East.	36 in.	Woodland Hills avenue	From west end of curve at Quincy st. to connect to 36 inch inlet pipe in north basin of Fairmount reservoir at 36 inch valve..	860		
	36 in.	Inlet pipe of Fairmount Reservoir	From Y at 90 feet north of Quincy st. in Woodland Hills ave. under embankment to inlet chamber of south basin	164		
	36 in.	Inlet pipe of Fairmount Reservoir	From inlet chamber in N. basin to connect with 36 inch pipe laid under embankment in 1883.	8	5,032	
	30 in.	Fairmount Reservoir	From 30 inch valve in southwest corner of north basin to end of pipe in northeast corner of north basin	581		
	30 in.	Outlet pipe of north basin of Fairmount Reservoir	From valve 72 ft. north of angle of Woodland Hills avenue to west end of 30 inch Y connecting with outlet pipe of south basin	61		
	30 in.	Outlet pipe of south basin of Fairmount Reservoir	From valve 49 ft. south of angle of Woodland Hills ave. to 30 in. Y in outlet pipe of north basin	155		
North.	30 in.	Kinsman	From T in Woodland Hills avenue to valve at Kinsman st. Reservoir	3,669		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
West	30 in.	Inlet pipe to Kinsman St. Res.	From valve in Kinsman street to inlet chamber	160		
East	30 in.	Extra inlet pipe to Kinsman street Reservoir.	From extra inlet chamber south	145		
East	30 in.	Woodland Hills avenue....	From 128 ft. S. of N. line, North Woodland to 30 in. to 20 in. T at Union St.	8,982		
West	30 in.	Woodland Hills avenue. ..	From 93 south of Quincy to S. L. Norman street..........................	906		
	30 in.	Woodland Hills avenue..	Connecting 36 inch inlet pipe of north basin of Fairmount Reservoir with 30 inch pipe of south basin....................................	39		
	20 in.	West side pumping works.	From west side of engine room of north building west..................	79		
	30 in.	West side pumping works..	Connecting delivery mains of east and west engines of north building ..	207		
	30 in.	Fairmount Res. outlet pipe..	From outlet chamber in south basin to connect with 30 inch pipe laid under embankment in 1883..	8	14,092	
	24 in.	Fairmount Res. waste pipe..	From outlet in south basin to Doan Creek, or 238 feet north of Fairmount St.	1,061		
	24 in.	Fairmount Res. waste pipe.	From outlet of north basin to connect with the main waste pipe..........	21		
	24 in.	Fairmount Res. overflow pipe	From 24 in. Y in waste pipe at foot of north slope of division embankment. up the slope to center of same..................................	50		
East....	24 in.	Woodland Hills avenue....	From 30 inch to 20 inch T at Union street, to 24 inch to 20 inch T at Way St.	2,814	8,055	

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884.—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
East..	20 in.	Bolton avenue.	From 18 feet north of Quincy street to 8 feet north of south line Quincy St.	65		
East...	20 in.	Doan	From 36 inch pipe in Quincy street to 18 feet north of Quincy street.	28		
	20 in.	Kinsman St. Res. waste pipe.	From outlet of waste pipe to end of 20 inch Y at east side of embankment.	132		
East..	20 in.	Woodland Hills avenue	From 24 inch to 20 inch T in Way street, to 20 inch to 16 inch T at Harvard St.	2,540	2,765	
North	16 in.	Harvard	From 20 inch pipe in Woodland Hills avenue to 25 feet west of Woodland Hills avenue	66		
North	16 in.	Kinsman	From 30 inch pipe in Woodland Hills avenue west	17		
North	16 in.	Miles	From 16 inch pipe in Woodland Hills avenue west	20		
North	16 in.	South Woodland.	From 20 inch pipe in Woodland Hills avenue west	17		
East..	16 in.	Woodland Hills avenue	From 20 inch to 16 inch T in Harvard to 16 inch T in Miles street.	1,342	1,462	
West	12 in.	Forest street	From pipe in Broadway to north line Broadway	23		
North	12 in.	Quincy street	From 20 inch pipe in Woodland Hills avenue to 12 feet east of Woodland Hills avenue	64		
West	12 in.	Woodland Hills avenue	From 12 inch pipe in Quincy street to 12 feet north of Quincy street.	47	134	
West	8 in.	Bolton avenue	From north line Euclid avenue north	384		
North	8 in.	Broadway.	From 156 feet west of Portage street to Engle	842		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884.—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
South	8 in.	Canal	From T at Champlain to T at Michigan street	737		4 to 8 relaid.
South	8 in.	Clark avenue	Pipe in Higgins to pipe in Gordon avenue	438		
South	8 in.	Champlain	Pipe in South Water street to T in Canal	217		4 to 8 relaid.
South	8 in.	Cedar avenue	From 33 feet east of Watkins street east	24		
South	8 in.	Cedar avenue	From pipe in Logan street to pipe in Burt street	120		
East	8 in.	Dunham avenue.	From pipe in Lexington street south	6		
East.	8 in.	Dunham avenue	From pipe in Superior to pipe in Astor street	2,008		
East.	8 in.	East Madison avenue	From pipe in Quincy to pipe in Garden street	1,044		
East.	8 in.	East River street	From S. L. St. Clair street to N. L. Superior street	513		4 to 8 relaid.
East	8 in.	East River street.	From pipe in Main street to pipe in Front street	794		
South	8 in.	Garden	From pipe in Brenton street to 6 feet east of Madison ave	1,318		
East	8 in.	Gordon avenue	From pipe in Lawn street to pipe in Colgate.	85		
North	8 in.	Hamilton	From 4 inch pipe in Lawrence street, east	117		
South	8 in.	Hough avenue	From 8 feet east of Willson avenue, east	840		
South	8 in.	Hough avenue	From pipe in Willson to 8 feet east of Willson avenue	70		6 to 8 relaid.
South	8 in.	Michigan	From T in Canal street to pipe in Ontario street	1,166		4 to 8 and 6 to 8 relaid.
East	8 in.	Olliver	Pipe in Superior to south line Superior street	75		
East	8 in.	Olliver	North line Euclid avenue, north	8		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884.—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
North...	8 in.	Payne avenue	West line North Perry street, west	14		
South...	8 in.	Quincy street	From 8 inch pipe in Bolton to east line Bolton avenue	86		
North...	8 in.	Ravine street	Pipe in Taylor to pipe in Root street	825		
South...	8 in.	St. Clair street	From hydrant at Becker avenue to west line Ansel avenue	2,547		
East	8 in.	Southern avenue	From pipe in South Woodland to T in North Woodland	66		
South...	8 in.	Superior street	From pipe in Giddings avenue west	164		
West	8 in.	Willson avenue	From 82 feet south of Armitage street to pipe in Lake View avenue	501		
West	8 in.	Wood street	S. L. St. Clair to N. L. Rockwell	357	14,851	4 to 8 cement re-laid.
East	6 in.	Ashland	From pipe in Garden to pipe in Quincy street	1,087		
East	6 in.	Addison	Pipe in White avenue, north	624		
South	6 in.	Armitage	From angle in Armitage street to pipe in Willson avenue	170		
South	6 in.	Astor	Pipe in Dunham avenue, east	465		
South...	6 in.	Apple	Pipe in Harbor to east line Harbor	24		
East	6 in.	Asylum	Pipe in Superior to north line Superior street	56		
South	6 in.	Barber avenue	West line Pearl street to 10 feet west of east line Hitchcock street	1,276		
East	6 in.	Beech	Pipe in Garden to 6 feet south of Garden street	27		
West & North	6 in.	Bradford	Pipe in Lorain street to 235 feet west of angle	582		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884.—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
West..	6 in.	Bond	Pipe in Euclid to south line Superior street	541		
North...	6 in.	Bailey	Pipe in Mechanic street to 8 feet west of Willett street	773		
East....	6 in.	Brooker	Pipe in Garden to pipe in Quincy street	1,028		
West...	6 in.	Burt	Pipe in Cedar avenue south	690		
East.	6 in.	Brunswick	Pipe in Superior street north	527		
West...	6 in.	Brooklyn	Pipe in Clark avenue to 370 south of Meyer avenue	1,979		
South ..	6 in.	Champlain	From 8 inch pipe in Canal St. to valve in Champlain on north line Canal St.	44		
East....	6 in.	Case avenue	From 26 feet north of L. S. & M. S. R. R., north	14		
East ...	6 in.	Calvert	From pipe in Cedar avenue south	43		
West...	6 in.	Courtland.	South line Bridge to north line Lorain	1,340		
East..	6 in.	Craw	Pipe in Quincy street north	652		
East..	6 in.	Chestnut Ridge	Pipe in Colgate to pipe in Lorain street	341		
South .	6 in.	Colgate	Pipe in Gordon avenue to pipe in Chestnut Ridge street.	1,399		
East....	6 in.	China	Pipe in Siam to pipe in Japan street	439		
South...	6 in.	Canal	From 8 inch pipe in Michigan street east	291		
North...	6 in.	Cook	From pipe in Harbor to east line Harbor street	24		
South...	6 in.	Clark avenue	From 12 feet east of west line Merchant Av. to pipe in Merchant Ave.	6		
South...	6 in.	Clinton street	From pipe in Ann street to pipe in Duane street	708		4 to 6 C relaid.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPES IN 1884—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
South	6 in.	Champs	Pipe in Broadway to west line Broadway	46		
East	6 in.	Clifton	Pipe in Superior to south line Superior	73		
North	6 in.	Dell	Pipe in Guard street west	80		
West	6 in.	Dare	From south line Detroit street to north line Franklin avenue	718		
East	6 in.	Duane	Pipe in Clinton to north line Franklin avenue	411		4 to 6 C. relaid.
South	6 in.	Dix	Pipe in East Madison avenue west	43		
West	6 in.	Empress	Pipe in Barber avenue to 400 feet north of Queen street	904		
East	6 in.	Edwards	Pipe in Quincy street to 202 feet south of Keyes street	591		
West	6 in.	Edson	Pipe in Barber avenue to 180 feet north of Queen street	678		
East	6 in.	First	North line Woodland avenue to pipe in Cypress street	623		
South	6 in.	Front	Pipe in Spring street to pipe in Water street	510		
South	6 in.	Fowler	Pipe in Broadway to 60 feet east of Hector street	678		
East	6 in.	Guard	Pipe in Woodland to pipe in Dell avenue	692		
East	6 in.	Giddings	Pipe in Superior to Wade Park avenue	1,250		
West	6 in.	Giddings	North line Woodland to south line Platt street	707		
West	6 in.	Giddings	South line Euclid avenue south	15		
South	6 in.	Glazier	Pipe in Nursery street east	536		
South	6 in.	Guilford	Pipe in Broadway to south line Broadway	41		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
East	6 in.	Hunter	14 feet north of Broadway north	877		
South	6 in.	Holmden	Pipe in Scranton avenue east	891		
East	6 in.	Higgings	Pipe in Lorain to pipe in Clark avenue	1,639		
East	6 in.	Hayward	From 282 feet south of Cedar avenue to north line of Garden street	681		
East	6 in.	Herald	From south line of Woodland avenue south	15		
East	6 in.	Harbor	From 17 feet south of Lorain to pipe in Ravine street	1,902		
South	6 in.	Home	From pipe in East Madison avenue west	588		
East	6 in.	Janes Court	From pipe in Euclid avenue north	83		
East	6 in.	Japan	Pipe in China street to Pipe in Chatam	100		
North	6 in.	Jefferson	Pipe in Herschell street west	190		
South	6 in.	Keyes	Pipe in Edwards street to west line of Edwards street	81		
South	6 in.	Kindsvater	Pipe in Willson avenue to pipe in Lyon street	840		
East	6 in.	Kirtland	Pipe in Superior to north line of Superior street	56		
South	6 in.	Lake View avenue	Pipe in Willson avenue to 119 feet west of Mina street	743		
East	6 in.	Lincoln avenue	Pipe in Woodland to 4 feet south of north line Platt street	844		
South	6 in.	Lexington	Pipe 120 feet west of Norwood street to pipe in Russell avenue	1,676		
South	6 in.	Lexington	Pipe in Willson avenue to pipe in Willard street	508		
East	6 in.	Lester	Pipe in Finn to east line of Gallup street	701		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884.—Continued

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
South	6 in.	Lime street.	Pipe across Valley R. R. near Sherwin & Williams to pipe in S. Water St	1,290		
East	6 in.	Mechanic.	Pipe in Bailey to north line of Bailey street	10		
East	6 in.	Mayflower	Pipe in Croton street to 83 feet south of Orange street	457		
North	6 in.	Monroe	Pipe in Willett to east line of Willett	37		
East	6 in.	Minnesota	Pipe in St. Clair street south	50		4 to 6 relaid.
East	6 in.	Minnesota	Pipe in Superior street to south line of Superior street	77		
West.	6 in.	Merchant avenue	Pipe in Clark avenue south	813		
East	6 in.	Muirson	North line of St. Clair street north	7		
West	6 in.	Newell	Pipe in Branch avenue to pipe in Castle avenue	1,296		
West	6 in.	Newell	Pipe in Clark avenue to pipe in Rowley street	411		
East	6 in.	Norwood	Pipe in Superior street to 57 feet south of Luther.	909		
South	6 in.	Prosser	From 6 feet east of Willson ave. to pipe in Lyon street	735		
West	6 in.	Petrie	From 12 feet south of Broadway to pipe in Barkwell street	2,076		
West.	6 in.	Petrie	From T at Clay street south.	26		
East	6 in.	Pleasant	Pipe in Clark avenue south	734		
South	6 in.	Platt	Pipe in East Madison to west line of Edwards street	622		
East	6 in.	Percival	Pipe in Superior to N. L. Superior street	56		
West	6 in.	Richardson	Pipe in Barkwell to 654 S. of Randolph	1,411		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884.—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
South..	6 in.	Rowley	Pipe in Jennings avenue to 478 east of Noyes street	865		
North...	6 in.	Rowley	Pipe in Newell street to 17 feet west of Newell street	46		
East....	6 in.	Root street	South line Lorain to pipe in Ravine street	1,697		
North...	6 in.	Ravine street	Pipe in Harbor to pipe in Taylor street	328		
West...	6 in.	Russell avenue	Pipe in Zoeter avenue to south line Wade Park avenue	550		
South...	6 in.	Roseville	Pipe in Broadway to west line Broadway	42		
West...	6 in.	Scott	South line Detroit street to north line Franklin avenue	702		
South...	6 in.	Sixth	From 751 feet west of Norwood to Norwood street	751		
East..	6 in.	Southern avenue	T in North Woodland north	581		
North..	6 in.	Siam	Pipe in Willet to Pipe Mechanic street	742		
North...	6 in.	Starkweather	Pipe in Pelton avenue to east line Professor street	1,596		
West...	6 in.	State	From 51 feet north of south line Division street south	203		
West...	6 in.	State	From south line Detroit street to pipe in Clinton street	514		4 to 6 relaid.
South...	6 in.	Seymour	Pipe in Rhodes avenue to pipe in Hitchcock street	996		
East...	6 in.	Taylor	14 feet south of Lorain to pipe in Ravine street	1,848		
West...	6 in.	University	Pipe in Literary street north	801		
South.	6 in.	Vega avenue	From 13 feet west of east line Pearl street to pipe in Scranton avenue	944		
South...	6 in.	Walton avenue	East line Pearl to 11 feet east of west line Joseph street	327		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
South..	6 in.	West Clinton .	East line Gordon avenue to 12 feet west of Waverly street	1,058		
East.	6 in.	Watkins	From 8 feet north of Cedar avenue north	9		
West	6 in.	Winter	Pipe in Columbus street to north line Leonard street	401		
East..	6 in.	Willett	Pipe in Monroe street to pipe in Chatham street	637		
South ..	6 in.	Wade avenue	East line Pearl street to pipe in Scranton avenue	898		
East....	6 in.	Water	Pipe in Front street south to connection	13		
South...	6 in.	West Madison avenue.	Pipe in Waverly to east line Aspen street	623		
South...	6 in.	Washington	93 feet west of Weddell street west	129		
South...	6 in.	Zoeter avenue.	Pipe in Dunham avenue to west line Giddings avenue	1,305		
East..	6 in.	Street running between Canal and Lime streets 225 feet east of Michigan.	From pipe in Canal street to pipe in Lime street	171		
East....	6 in.	Street 313 feet east of Perry.	Pipe in Superior to south line Superior street	76		
East.	6 in.	Street 286 ft. West of Oliver.	Pipe in Superior to south line Superior street	74		
East.	6 in.	For Hydrants		234	65,704	
South...	4 in.	Avery	Pipe in Lester street east	372		
East .	4 in.	Culver	Pipe in Schott street north	250		

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1884.—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
South..	4 in.	Ewald	Pipe in East Madison avenue east	246		
East...	4 in.	Foljambe	Pipe in Cypress street north	822		
North...	4 in.	Jerome alley	Pipe in Cross street west	430		
South..	4 in.	Mabel	Pipe in Franklin court to west line Fulton street	400		
East .	4 in.	Magnet	Pipe in Broadway north	38		
East....	4 in.	Pleasant	End of 4 in. pipe to connect 6 in. pipe in Pleasant St. at N. O. Woolen Mills	17		
East..	4 in.	Sago	Pipe in Sibley street to pipe in Cedar avenue	426		
	4 in.	For hydrants		2,412	4,922	
East....	3 in.	Bright alley	North line St. Clair to 102 feet north of Noble alley	298		
	3 in.	Waller.	From 128 feet north of Bolivar street north	82		
	3 in.	For hydrants		18	398	

SCHEDULE OF PIPE TAKEN UP AND RELAID IN 1884.

Diameter of Pipe Taken Up.	Diameter of Pipe Relaid	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
4 inch	8 inch.	Canal street	Pipe in Champlain street to south line Michigan	844		Iron
4 inch	8 inch.	Champlain	Pipe in South Water to 6 inch pipe in Champlain	285		Iron.
4 inch	6 inch	Clinton	Pipe in Ann street to pipe in Duane street	708		Cement.
8 inch	3 inch	Bright alley	North line St. Clair to 102 feet north of Noble Alley	218		Cement
4 inch	6 inch.	Duane	Pipe in Clinton to north line Franklin avenue	414		Cement.
4 inch	8 inch	East River	North line Superior to 10 feet south of St. Clair	502		Iron.
6 inch	8 inch	Hough avenue	Pipe in Willson avenue to 8 feet south of Willson avenue	70		Iron.
4 inch	6 inch	Minnesota	Pipe in St. Clair street south	50		Iron.
4 inch	8 inch	Michigan	Pipe in Ontario to east line Seneca	543		Iron.
6 inch	8 inch	Michigan	Pipe in Seneca to east line Seneca	24		Iron.
4 inch	8 inch	Michigan	Pipe in Seneca street to pipe in Canal street	509		Iron.
4 inch	6 inch	State	Pipe in Clinton street to south line Detroit street	514		Cement
4 inch	8 inch	Wood	South line St. Clair to north line Rockwell	357		Cement
4 inch	6 inch	Hydrants.		36		Iron.
3 inch	4 inch	Hydrants.		114	5,368	Iron.

TOTAL FEET OF PIPE LAID TO DECEMBER 31, 1884.

Diameter of pipe in inches	36	30	24	20	16	12	10	8	6	4	3
Laid previous to 1884	9,130	37,687	10,989	11,002	12,628	8,664	69,483	163,198	450,176	139,362	14,700
Laid in 1884	5,032	14,992	3,955	2,765	1,462	134		14,851	65,704	4,922	398
Total	141,162	52,679	14,944	13,767	14,090	8,798	69,483	178,049	515,880	144,284	15,098
Taken up in 1884									94	4,832	442
Totals in use	14,162	52,679	14,944	13,767	14,090	8,798	69,483	178,049	515,786	139,452	14,656
	109,642					926,224					

RECAPITULATION.

109,642	feet of supply main	equal to	20 miles	4,042 feet.
926,224	feet of distributing main	equal to	175 miles	2,224 feet.
1,035,866	feet of main	equal to	196 miles	986 feet.
80,641	increased feet of distributing main in 1884	equal to	15 miles	1,441 feet.
28,206	increased feet of supply main in 1884	equal to	5 miles	1,806 feet.
108,847	increased feet of main	equal to	20 miles	3,247 feet.

SCHEDULE SHOWING STREETS IN WHICH WATER PIPE WAS LOWERED IN 1894.

Side.	Size.	Street.	Location.	Feet.	Total.
South.	6 inch	Burwell	W. L. Case avenue to Forest	960	
North.	6 inch	Champlain	N. L. Canal street to Seneca street	1,240	
South.	4 inch	Clinton	Hanover to Ann street	320	
South.	4 inch	Church	Pearl street to Hanover	500	
North.	12 inch	Franklin avenue	Kentucky street to 50 feet east of Root street	1,350	
East.	6 inch	Hanover	Church street to Circle	700	
		Franklin street intersections.		116	
North.	10 inch	Superior	Perry street to Willson avenue	8,000	
		Superior street intersections.		1,320	
West	12 inch	Willson avenue	Euclid avenue to Garden street	2,740	
West	10 inch	Willson avenue	Garden street to Woodland avenue	2,850	
		Willson avenue intersections.		320	20,416

20,416 feet, equal to 3 miles and 4,576 feet.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	East	Addison	269	North of White ave	
1	4 inch	East	Addison	588	North of White ave	
1	4 inch	East	Alabama	15	North of Superior st	
1	4 inch	East	Ashland	850	South of Garden st	
1	4 inch	East	Ashland	250	North of Quincy st	
1	4 inch	South	Astor	441	East of Dunham av	
1	4 inch	South	Avery	358	East of Lester st	
1	4 inch	South	Barber		At Empress st	
1	4 inch	South	Barber	302	West of Mill st	
1	4 inch	South	Barber		At Hitchcock st	
1	3 inch	North	Bradford	185	West of Angle in Bradford st	
1	4 inch	North	Broadway	42	East of Portage st	
1	4 inch	North	Broadway	82	East of Cable st	
1	4 inch	North	Broadway		At Engel st	
C 1	4 to 4	North	Broadway		At Petrie st	
C 1	4 to 4	North	Broadway		At Smith st	
1	4 inch	North	Bailey		At Devine st	
1	4 inch	North	Bailey		At Willett st	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1881 Continued

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	West	Bond	101	South of Superior st.	
1	6 inch	East	Bond		At Euclid ave	
1	4 inch	West	Bolton	554	North of Euclid ave	
1	4 inch	East	Brooker	272	South of Garden st	
1	4 inch	East	Brooker	271	North of Quincy st	
1	4 inch	West	Burt	235	South of Cedar ave	
1	4 inch	West	Burt	662	South of Cedar ave	
1	4 inch	East	Brunswick	114	North of Spencer st	
1	4 inch	West	Brooklyn	256	South of Clark ave	
1	4 inch	West	Brooklyn	635	South of Clark ave	
1	4 inch	West	Brooklyn	415	North of Meyer ave.	
1	4 inch	West	Brooklyn.	14	South of Meyer ave.	
1	4 inch	West	Brooklyn	370	South of Meyer ave.	
1	4 inch	South	Canal	237	East of Michigan st.	
1	6 inch	South	Canal		At Champlain st	
1	3 to 6	North	Canal.	250	East of Champlain st	
1	6 inch	North	Canal	47	West of angle of Michigan st	
1	4 inch	East	Case	46	North of L. S. & M. S. Railroad	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	6 inch	South	Champlain	45	East of South Water st	
C 1	4 to 6	North	Champlain	211	West of Seneca st	
1	6 inch	North	Champlain	531	West of Seneca st	
1	4 inch	South	Colgate		At Chestnut Ridge st	
1	4 inch	South	Colgate	356	East of Chestnut Ridge st	
1	4 inch	South	Colgate	594	West of Gordon ave	
1	1 inch	South	Colgate	237	West of Gordon ave	
1	4 inch	East	China	202	North of Siam st	
1	4 inch	South	Church		At Wall st	
C 1	3 to 4	South	Church		At Hanover st	
1	4 inch	West	Courtland	159	North of Duke st	
1	4 inch	West	Courtland	155	South of Duke st	
1	4 inch	West	Courtland	270	North of Lorain st	
1	4 inch	East	Craw	274	North of Quincy st	
1	4 inch	East	Craw	603	North of Quincy st	
1	4 inch	East	Culver	281	North of Schott st	
1	4 inch	East	Dunham	351	South of Superior st	
1	4 inch	East	Dunham		At Whitney st	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	East	Dunham	35	North of Pennsylvania ave	
1	4 inch	East	Dunham	36	North of Zoeter ave	
1	4 inch	East	Dunham		At Astor ave	
1	4 inch	West	Dare	260	South of Detroit st	
1	4 inch	West	Dare	114	North of Franklin ave	
1	4 inch	East	Duane		At Clinton st	
1	4 inch	East	Duane	20	North of Franklin ave	
1	4 inch	East	East Madison		At Amos st	
1	4 inch	East	East Madison	10	North of Lucia street	
1	4 inch	East	East Madison	21	North of Euclid ave	
C 1	3 to 4	East	East River	182	North of Superior st	
1	4 inch	East	East River	36	South of St. Clair st	
1	4 inch	East	East River	59	North of Main st	
1	4 inch	East	East River	339	North of Main st	
C 1	3 to 6	East	East River	56	South of Front st	
1	4 inch	East	Edison	237	North of Barber ave	
1	4 inch	West	Edison	100	North of Queen st	
1	4 inch	West	Empress	281	North of Barber ave	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884—Continued.

No.	Size.	Side.	Street.	Feet	Location.	Remarks.
1	4 inch	West	Empress	148	North of Queen st	
	4 inch	East.	Empress	305	North of Queen st	
	4 inch	South..	Ewald	222	East of East Madison ave	
	4 inch	East	Foljambe	292	North of Cypress st	
1	4 inch	East.	First	..	At Haltnorth st	
1	4 inch	East	Fowler	297	North of Broadway	
1	4 inch	East.	Fowler	60	North of Hector st	
1	4 inch	South..	Front	167	West of Water st	
1	4 inch	South.	Garden	78	East of Parker st	
1	4 inch	South	Garden	36	West of Lussenden st	
1	4 inch	South..	Garden		At East Madison ave	
1	4 inch	East	Giddings	73	North of Whitney st	
1	4 inch	East	Giddings	313	South of Whitney st	
1	4 inch	East.	Giddings		At Wade Park ave	
1	4 inch	West.	Giddings	85	North of Woodland ave	
1	4 inch	West	Giddings	349	South of Platt st	
1	4 inch	West	Giddings		At Platt st	
1	4 inch	South	Glazier		At Victor st	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884—Continued.

No.	Size.	Side.	Street	Feet.	Location.	Remarks.
1	4 inch	South..	Glazier		At Sawtell ave	
1	4 inch	East.	Guard	100	South of Woodland ave	
1	4 inch	East.	Guard.		At Dell ave	
1	4 inch	South..	Hough	308	East of Willson ave.	
1	4 inch	South.	Hough	851	East of Willson ave	
1	4 inch	East.	Harbor		At Peach st.	
1	4 inch	East.	Harbor	383	South of Cook st.	
1	4 inch	East.	Harbor	16	North of Buckley st.	
1	4 inch	East.	Hayward	317	South of Cedar ave	
1	4 inch	East.	Hayward	236	North of Garden st	
1	4 inch	East.	Higgins	11	North of Hague st	
1	4 inch	East.	Higgins	210	North of Conrad st	
1	4 inch	East.	Higgins	155	South of Conrad st	
1	4 inch	East.	Higgins.		At Clark ave	
1	4 inch	South..	Holmden	428	East of Scranton ave	
1	4 inch	South..	Holmden	865	East of Scranton ave	
1	4 inch	South..	Home.	238	West of East Madison ave	
1	4 inch	South..	Home.	502	West of East Madison ave	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS IN 1884—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	East.	Hunter	146	North of Broadway	
1	4 inch	East.	Hunter	475	North of Broadway	
1	4 inch	East.	Hunter	891	North of Broadway	
C 1	4 to 4.	West	Huntington	191	North of Garden st	
1	3 inch	North	Jerome alley	411	West of Cross st	
1	4 inch	South	Kindsvater	227	East of Willson ave	
1	4 inch	South	Kindsvater	226	West of Lyon st	
1	4 inch	South	Lake View avenue.	322	West of Willson ave	
1	4 inch	South	Lake View avenue	119	West of Mina st	
1	4 inch	North	Lester	91	East of Avery st	
1	4 inch	North	Lester		At Gallup st	
1	4 inch	South	Lexington	288	West of Willson ave	
1	4 inch	South	Lexington		At Norwood st	
1	4 inch	South	Lexington	46	East of Dunham ave	
1	4 inch	South	Lexington	381	West of Russell ave	
1	4 inch	South	Lime	186	East of South Water st	
1	4 inch	South	Lime	445	East of South Water st	
1	4 inch	South	Lime	687	East of South Water st	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	South	Lime	947	East of South Water st	
1	4 inch	East	Lincoln	107	North of Woodland ave	
1	4 inch	East	Lincoln	118	North of Woodland ave	
1	4 inch	East	Lincoln		At Platt st	
C 1	3 to 6 inch	South	Michigan		At Canal st	
1	6 inch	South	Michigan	208	West of Seneca st	
1	6 inch	South	Michigan	200	West of Ontario st	
1	4 inch	East	Mayflower	120	North of Croton st	
1	4 inch	West	Merchant	249	South of Clark ave	
C 1	3 to 4 inch	East	Minnesota		At Superior st	
1	4 inch	East	Norwood	44	North of Dibble st	
1	4 inch	East	Norwood	57	South of Luther st	
1	4 inch	West	Newell	280	North of Mentor ave	
1	4 inch	West	Newell	285	North of Castle ave	
1	4 inch	West	Petrie		At Jewett st	
1	4 inch	West	Petrie	88	South of Bliss st	
1	4 inch	West	Petrie	130	North of Rockert	
1	4 inch	West	Petrie	108	South of Rockert	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	West	Petrie	46	North of Anson	
1	4 inch	South	Platt	294	East of East Madison ave	
1	4 inch	South	Platt		At Edwards st	
1	4 inch	East	Pleasant	772	South of Clark ave	
1	4 to 4	East	Pleasant	727	South of Clark ave	
1	4 inch	South	Prosser	825	East of Willson ave	
1	4 inch	North	Ravine		At Harbor st	
1	4 inch	South	Richardson	198	West of Hamm st	
1	4 inch	South	Richardson		At Randolph st	
1	4 inch	South	Richardson	298	East of Randolph st	
1	4 inch	South	Richardson		At Blanche st	
1	4 inch	East	Root	224	South of Lorain st	
1	4 inch	East	Root	206	North of Turn st	
1	4 inch	East	Root	119	South of Turn st	
1	4 inch	East	Root	859	North of Ravine st	
1	4 inch	East	Root		At Ravine st	
1	4 inch	South	Rowley	17	West of Newell st	
1	4 inch	South	Rowley	478	East of Noyes st	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884 Continued.

No	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	South	Rowley	129	East of Noyes st	
1	4 inch	South	Rowley	113	East of Jennings ave	
1	4 inch	West	Russell	92	South of Kindsvater st	
1	4 inch	West	Russell		At Wade Park ave	
C 1	3 to 4 inch	East	Rossiter		At Superior st	
1	4 inch	East	Sago	154	North of Cedar ave	
1	4 inch	South	St Clair	329	East of Becker ave	
1	4 inch	South	St Clair		At Hodge ave	
1	4 inch	South	St. Clair		At Malden st	
1	4 inch	South	St. Clair		At Ansel ave	
1	4 inch	East	Southern	178	North of North Woodland ave	
1	4 inch	East	Southern	347	North of North Woodland ave	
C 1	3 to 4 inch	North	Superior	311	West of Oliver st	
C 1	3 to 4 inch	North	Superior		At Oliver st	
C 1	3 to 4 inch	North	Superior		At Delaware st	
C 1	3 to 4 inch	North	Superior		At Phelps st	
1	4 inch	East	Seigel		At Superior st	
1	4 inch	East	Sterling		At Superior st	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1904—Continued.

[illegible]	[illegible]	[illegible]	[illegible]	Feet	Location	Remarks
	[illegible]	[illegible]	[illegible]	[illegible]	South of Detroit st	
	[illegible]	[illegible]	[illegible]	[illegible]	East of [illegible] ave	
	[illegible]	[illegible]	[illegible]	[illegible]	West of [illegible] st	
	[illegible]	[illegible]	[illegible]	[illegible]	East of [illegible] st	
	[illegible]	[illegible]	[illegible]	[illegible]	East of [illegible] st	
		[illegible]	[illegible]	[illegible]	West of Norwood st	
	[illegible]	[illegible]	[illegible]		At Norwood st	
		[illegible]	[illegible]	[illegible]	East of Fulton ave	
		[illegible]	[illegible]		At Tremont st	
		[illegible]	[illegible]	[illegible]	East of Tremont st	
		[illegible]	[illegible]		At [illegible] st	
		[illegible]	[illegible]	[illegible]	South of Detroit st	
	[illegible]	[illegible]	[illegible]		At [illegible] st	
[illegible]	[illegible]	[illegible]	[illegible]		At [illegible] st	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	South of [illegible] st	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	North of [illegible] st	
[illegible]	[illegible]	[illegible]	[illegible]		At [illegible] st	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	North of [illegible]	

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1884 Continued.

No.	Size	Side.	Street.	Feet.	Location.	Remarks.
1	4 inch	East	Taylor		At Ravine st	
1	4 inch	South	University	296	West of Literary st	
1	4 inch	South	University	761	West of Literary st	
1	4 inch	South	Vega	308	East of Pearl st	
1	4 inch	South	Vega	214	West of Scranton ave	
1	4 inch	South	Wade	246	East of Pearl st	
1	4 inch	South	Wade	261	West of Scranton ave	
1	4 inch	South	Walton		At Joseph st	
1	4 to 4	South	Washington	215	West of Weddell st	
1	4 inch	South	West Clinton	825	West of Waverly st	
1	4 inch	South	West Clinton	880	East of Gordon ave	
1	4 inch	South	West Clinton		At Gordon ave	
1	4 inch	South	West Madison	273	West of Waverly st	
1	4 inch	South	West Madison		At Aspen st	
1	4 inch	East	Willett	10	North of Horace st	
1	4 inch	West	Winter		At Leonard st	
1	4 inch	West	Willson		At Armitage	
1	4 inch	West	Willson	110	South of Lake View ave	

[illegible] SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1894—Continued.

[illegible]	[illegible]	[illegible]	Feet	Location.	Remarks.
[illegible]	[illegible]	[illegible]		At Fifth ave.	
[illegible]	[illegible]	[illegible]	141	South of St. Clair st.	
[illegible]	[illegible]	[illegible]		At Rockwell st.	
	[illegible]	[illegible]		At Superior st.	
[illegible]	[illegible]	[illegible]	407	East of Dunham ave.	
		[illegible]		At Russell ave.	
	[illegible]	[illegible]		At Giddings ave.	
	[illegible]	[illegible]		At Superior st.	

SCHEDULE
SHOWING THE LOCATION OF FIRE HYDRANTS CHANGED IN 1884

No.	Taken up.	Set.	Side.	Street.	Feet.	Location.
1	4	4	North	Broadway.		At Petrie street, was moved 4½ feet east.
1	4	4	North	Broadway		At Smith street, was moved 3½ feet west.
1	3	6	North	Canal.	250	East of Champlain St. changed from 240 feet east of Champlain.
1	4	6	North	Champlain	341	West of Seneca street, changed from 380 feet west of Seneca St.
1	3	4	South	Church		At Hanover street.
1	3	4	East	East River	182	North of Superior, changed from 225 feet south of St. Clair St.
1	3	6	East.	East River	56	South of Front street, changed from south line of Front street.
1	1	4	West	Huntington.	191	North of Garden St., changed from 240 feet north of Garden St.
1	3	6	South	Michigan.		At Canal street, changed from north side of street.
1	3	4	East	Minnesota.		At Superior street, changed to south side of Superior street 180 feet west of Minnesota street.
1	4	4	East	Pleasant	787	South of Clark Ave., changed from 515 feet south of Clark Ave.
1	3	4	East	Rossiter		At Superior street, changed from south side of Superior street.
1	3	4	North	Superior	311	West of Oliver street, changed from 510 feet west of Oliver St.
1	3	4	North	Superior		At Oliver street.
1	3	4	North	Superior		At Delaware street

SCHEDULE

SHOWING THE LOCATION OF FIRE HYDRANTS CHANGED IN 1884—Continued.

No.	Taken up.	Set.	Side.	Street.	Feet.	Location.
1	3	4	North	Superior		At Phelps street
1	4	4	East.	Washington	215	West of Weddell street, changed from 93 feet west of Weddell St
1	3	4	South	Wason		At Superior, changed from Superior to Wason street pipe
1	4	4	West	Willson		At Fifth avenue, was moved 6 feet south

RECAPITULATION OF HYDRANTS FOR 1884.

3 inch hydrants set in 1884	3
4 inch hydrants set in 1884	208
6 inch hydrants set in 1884	13
Total	224
Total hydrants in use Dec. 31st, 1883	1,501
Total	1,725
Hydrants taken out in 1884	19
Total hydrants in use December 31st, 1884	1,706

Of 1,706 hydrants in use, 47 are 6 inch, the balance are 3 and 4 inch.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884.

No.	Size.	Street.	Side.	Location.	Remarks.
1	36 inch	Quincy st	North	East line Hewitt ave	
1	36 inch	Quincy st	North	West line Woodland Hills ave	
1	36 inch	Woodland Hills ave	East	110 feet north of Quincy st. 6 feet west of east line.	
1	36 inch	Woodland Hills ave	East	17 feet north of Norman st. 5 feet 6 in. west of east line.	
1	36 inch	North basin of Fairmount Reservoir	West	On 36 in. inlet pipe in southwest corner of north basin	
1	36 inch	South basin of Fairmount Reservoir	West	On 36 in. inlet pipe in southwest corner of south basin	
6		Total 36 inch stop gates.			
1	30 inch	Kinsman	North	East line Woodland Hills ave	
1	30 inch	Kinsman	North	On 30 inch inlet pipe to Kinsman street reservoir, and 5 feet 6 inches south of north line Kinsman st	
1	30 inch	Kinsman St. Reservoir		On 30 inch inlet pipe inside of basin	
1	30 inch	Kinsman St. Reservoir		On extra inlet pipe inside of basin, and 28 feet east of preceeding valve	
1	30 inch	North engine house grounds of West Side pumping works		Check valve 14 ft. W. and 14 ft. N. of S. L. engine house.	
1	30 inch	North engine house grounds of West Side pumping works		43 ft. west and 16 ft. N. of south line engine house	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884 Continued.

No	Size.	Street.	Side.	Location.	Remarks.
1	30 inch	North engine house grounds of West Side pumping works		28½ feet west of east line engine house, and 13 feet north of Division street.	
1	30 inch	North engine house grounds of West Side pumping works		31½ feet east of west line engine house, and 12 feet north of Division street	
1	30 inch	North basin of Fairmount reservoir.		On 30 inch outlet pipe in southwest corner of north basin.	
1	30 inch	South basin of Fairmount reservoir		On 30 inch outlet pipe in northwest corner of south basin.	
1	30 inch	Woodland Hills ave.	East	40 feet north of Norman street and 5 feet west of east line.	
1	30 inch	Woodland Hills ave	East	5 feet south of north line of Norman street and 30 feet west of east line	Connection valve.
1	30 inch	Woodland Hills ave	East	33 feet south of Norman street and 5 feet west of east line.	
1	30 inch	Woodland Hills ave	West	North line Norman and 19 feet east of west line	
1	30 inch	Woodland Hills ave	East	South line South Woodland avenue from the east	
1	30 inch	Woodland Hills ave	East	North line Kinsman street.	
1	30 inch	Woodland Hills ave	East	South line Kinsman street.	
17		Total 30 inch stop gates.			
1	24 inch	Fairmount reservoir		In northeast corner of north basin, on 24 inch waste pipe.	
1	24 inch	Fairmount reservoir		In southeast corner of north basin, on 24 inch waste pipe.	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	24 inch....	Fairmount reservoir..............	....	In northeast corner of south basin, on 24 inch waste pipe.	
1	24 inch....	Woodland Hills avenue................	East	South line Union street....................................	
4	....	Total 24 inch stop gates.			
1	20 inch ...	Kinsman street Reservoir	East	On 20 inch waste pipe........................	
1	20 inch....	Woodland Hills avenue................	East	South line of Way street from the west............	
1	20 inch....	Bolton	East	North line Quincy street..........................	
1	20 inch....	Doan	East	North line Quincy street..........................	
4	....	Total 20 inch stop gates.			
1	16 inch....	Harvard	North	28 feet west of east line of Woodland Hills avenue, 18 feet south of north line of Harvard street.	Connection valve.
1	16 inch...	Harvard	North ...	West line of Woodland Hills avenue.....................	
1	16 inch....	Kinsman....................................	North ...	35 feet west of east line of Woodland Hills avenue, and 8 feet south of north line of Kinsman street............	Connection valve.
1	16 inch....	Miles	North	24 feet west of east line of Woodland Hills avenue, and 25 feet south of North line Miles street...............	Connection valve.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	16 inch	South Woodland	North	84 feet West of east line Woodland Hills avenue, and on north line Woodland avenue from the east	Connection valve.
1	16 inch	Woodland Hills avenue	East	South line Harvard street	
6		Total 16 inch stop gates.			
1	12 inch	Forest	West	North line of Broadway	
1	12 inch	Quincy	North	East line Woodland Hills avenue.	
1	12 inch	Woodland Hills	West	North line Quincy street	
1	12 inch	Woodland Hills		85 feet south of north line of Quincy street, and 46 feet west of east line of Woodland Hills avenue	Connection valve.
4		Total 12 inch stop gates.			
1	8 inch	Bolton	West	North line of Euclid avenue	
1	8 inch	Broadway	North	West line of Engel street.	
1	8 inch	Canal.	South	South line of Champlain street.	
1	8 inch	Clark	South	West line of Gordon avenue	
C 1	4 to 8.	Champlain	North	East line of South Water street.	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	8 inch.	Dunham	East	South line of Superior street	
1	8 inch.	Dunham	East	North line of Wade Park avenue	
1	8 inch.	Dunham	East	North line of Astor avenue	
1	8 inch.	East Madison	East	South line of Garden street	
1	8 inch.	East Madison	East	North line of Quincy street	
1	8 inch.	East River	East	South line of Front street	
1	8 inch.	East River	East	North line of Main street	
1	8 inch.	Garden	South	East line of Brooker avenue from the north	
1	8 inch.	Garden	South	West line of East Madison avenue	
1	8 inch.	Garden	South	East line of East Madison avenue	
1	8 inch.	Hamilton	North	East line of Lawrence street	
C 1	6 to 8.	Hough	South	East line of Willson avenue	
C 1	4 to 8.	Michigan	South	North line of Canal street	
C 1	4 to 8.	Michigan	South	West line of Seneca street	
C 1	4 to 8.	Michigan	South	East line of Seneca street	
C 1	4 to 8.	Michigan	South	West line of Ontario street	
1	8 inch.	Oliver	East	South line of Superior street	
1	8 inch.	Quincy	South	East line of Bolton avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884 Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	8 inch	Quincy	South	27 feet east of west line of Bolton avenue, and 23 feet north of south line of Quincy street	Connection valve.
1	8 inch	Ravine	North	East line of Root street	
1	8 inch	St Clair	South	East line of Hodge avenue	
1	8 inch	St. Clair	South	East line of Malden street	
1	8 inch	St. Clair	South	West line Ansel avenue	
1	8 inch	Superior	South	West line Giddings avenue	
1	8 inch	Willson	West	North line Armitage street.	
1	8 inch	Wood	West	North line Rockwell street	
31		Total 8 inch stop gates.			
1	6 inch	Addison	East.	North line White avenue	
1	6 inch	Ashland	East.	South line Garden street	
1	6 inch	Ashland	East.	North line Quincy street	
1	6 inch	Armitage	South	East line Willson avenue	
1	6 inch	Astor	South	East line Dunham avenue	
1	6 inch	Apple	South	East line Harbor street	
1	6 inch	Asylum	East.	North line Superior street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 inch	Barber	South	West line Pearl street	
1	6 inch	Barber	South	East line Mill street	
1	6 inch	Barber	South	West line Hitchcock street	
1	6 inch	Beech	East	South line Garden street	
1	6 inch	Bradford	South	East line Lorain street	
1	6 inch	Bond	West	North line Euclid avenue	
1	6 inch	Bailey	North	West line Devine street	
1	6 inch	Brooker	East	South line Garden street	
1	6 inch	Brooker	East	North line Quincy street	
1	6 inch	Burt	West	South line Cedar avenue	
1	6 inch	Brunswick	East	North line Superior street	
1	6 inch	Brooklyn	West	South line Clark avenue	
1	6 inch	Brooklyn	West	695 feet south of Clark avenue at 2d hydrant south of Clark avenue	
1	6 inch	Brooklyn	West	North line Myer avenue	
1	6 inch	Brooklyn	West	South line Myer avenue	
1	6 inch	Calvert	East	South line of Cedar avenue	
1	4 to 6	Canal	South	South line of Canal, from the west.	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No	Size.	Street.	Side.	Location.	Remarks.
1	6 inch	Champa.	East	South line of Broadway.	
1	6 inch.	Chestnut Ridge.	East	North line of Lorain street.	
1	6 inch	China	East	North line of of Siam street	
1	6 inch.	China.	East.	West line of Japan street	
1	6 inch	Clifton	East	South line of Superior street.	
C 1	4 to 6.	Clinton.	South	West line of State street.	
C 1	4 to 6.	Clinton	South	East line of Duane street.	
1	6 inch.	Colgate	South	West line of Gordon avenue	
1	6 inch.	Colgate..	South	West line of Brigg street	
1	6 inch	Colgate..	South	East line of Chestnut Ridge street	
1	6 inch.	Courtland.	West	South line of Duke street	
1	6 inch	Courtland	West	North line of Lorain street	
1	6 inch	Craw	East	North line of Quincy street	
1	6 inch	Dare	West	North line of Franklin avenue	
1	6 inch.	Dell	North	West line of Guard street	
1	6 inch	Dix.	South	West line of East Madison avenue	
C 1	4 to 6	Duane	South	South line of Clinton street	
1	6 inch	Edson	West	West line of Barber avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 inch.	Edwards	East	South line of Quincy street	
1	6 inch	Empress	West	North line of Barber avenue	
1	6 inch	Empress	West	North line of Queen street	
1	6 inch.	First	East	North line of Woodland avenue	
1	6 inch.	First	East	South line of Cypress street	
1	6 inch.	Fowler	East	North line of Broadway	
1	6 inch.	Front	South	East line of Spring street	
1	6 inch	Giddings	East	South line of Superior street	
1	6 inch	Giddings	East	South line of Whitney street	
1	6 inch	Giddings	East	North line of Wade Park avenue	
1	6 inch	Giddings	West	North line of Woodland avenue	
1	6 inch	Glazier	South	East line of Nursery street	
1	6 inch	Guard	East	South line of Woodland avenue	
1	6 inch.	Guilford	East	South line of Broadway	
1	6 inch.	Harbor	East	South line of Cook street	
1	6 inch.	Harbor	East	North line of Ravine street	
1	6 inch.	Hayward	East	North line of Garden street	
1	6 inch.	Herald	East	South line of Woodland avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 inch	Higgins.	East.	South line of Lorain street	
1	6 inch	Higgins	East.	South line of Conrad street	
1	6 inch.	Higgins.	East.	North line of Clark avenue	
1	6 inch	Holmden	South.	East line of Scranton avenue	
1	6 inch.	Home	South	West line of East Madison avenue.	
1	6 inch	Japan	East.	South line of Chatham street.	
1	6 inch.	Jaynes Court	East.	North line of Euclid avenue.	
1	6 inch.	Jefferson	North	West line of Herschell street	
1	6 inch.	Keyes	South	West line of Edwards street	
1	6 inch.	Kindsvater	South	East line of Willson avenue	
1	6 inch.	Kindsvater	South	West line of Lyon	
1	6 inch.	Kirtland	East	North line of Superior street	
1	6 inch	Lake View	South	West line of Willson avenue	
1	6 inch	Lester	North	West line of Finn street	
1	6 inch.	Lexington	South	West line of Russell avenue	
1	6 inch	Lexington	South	West line of Dunham avenue	
1	6 inch	Lexington	South	West line of Norwood street.	
1	6 inch	Lexington	South	West line of Willson avenue.	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
[illegible]	[illegible]	Lexington	South	East line Willard street	
[illegible]	[illegible]	[illegible]	North	East line South Water street	
[illegible]	[illegible]	Lincoln	East	North line Woodland avenue	
[illegible]	[illegible]	Lincoln	East	South line Platt street	
[illegible]	[illegible]	Mayflower	East	North line Croton street	
[illegible]	[illegible]	Merchant	West	South line Clark avenue	
[illegible]	[illegible]	Minnesota	East	South line St. Clair street	
[illegible]	[illegible]	Minnesota	East	South line Superior street	
[illegible]	[illegible]	Newell	West	North line Castle avenue	
[illegible]	[illegible]	Newell	West	South line Mentor avenue	
1	6 inch	Newell	West	North line Mentor avenue	
1	6 inch	Newell	West	South line Branch avenue	
1	6 inch	Newell	West	North line Clark avenue	
1	6 inch	Norwood	East	South line Superior street	
1	8 inch	Norwood	East	North line Luther street	
1	8 inch	Percival	East	North line Superior street	
1	8 inch	Petrie	West	South line Bliss street	
1	8 inch	Petrie	West	South line Rockert street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location	Remarks.
1	6 inch	Platt	South	East line East Madison avenue	
1	6 inch	Pleasant	East	South line Clark avenue	
1	6 inch	Prosser	South	West line Lyon street	
1	6 inch	Richardson	South	East line Barkwill street	
1	6 inch	Richardson	South	East line Hamm street from the north	
1	6 inch	Root	East	South line Lorain street	
1	6 inch	Root	East	South line Turn street	
1	6 inch	Root	East	North line Ravine street	
1	6 inch	Roseville	East	South line Broadway	
1	6 inch	Rowley	South	East line Jennings avenue	
1	6 inch	Russell	West	North line Zoeter avenve	
1	6 inch	Scott	West	North line Franklin avenue	
1	6 inch	Seymour	South	East line Rhodes avenue	
1	6 inch	Seymour	South	West line Hitchcock street	
1	6 inch	Siam	North	West line Willet street	
1	6 inch	Siam	North	East line Mechanic street	
1	6 inch	Southern	East	North line North Woodland avenue	
1	6 inch	Starkweather	North	East line Pelton avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 inch	Starkweather	North	East line Tremont street	
1	6 inch	Starkweather	North	East line Professor street	
1	6 inch	State	West	South line Division street	
C 1	4 to 6	State	West	North line Clinton street	
1	6 inch	Taylor	East	South line Turn street	
1	6 inch	Taylor	East	North line Ravine street	
1	6 inch	University	South	West line Literary street	
1	6 inch	Vega	South	East line Pearl street	
1	6 inch	Vega	South	West line Scranton avenue	
1	6 inch	Wade	South	East line Pearl street	
1	6 inch	Wade	South	West line Scranton avenue	
1	6 inch	West Madison	South	West line Waverly street	
1	6 inch	Willett	East	North line Siam street	
1	6 inch	Winter	East	West line Columbus street	
1	6 inch	Zoeter	South	East line Dunham avenue	
1	6 inch	Zoeter	South	West line Russell avenue	
1	6 inch	Zoeter	South	East line Russell avenue	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6 inch	Street running between Lime & Canal st., 325 feet east of Michigan street	East	South line Canal street	
1	6 inch	Street 343 feet east of Perry street	East	South line Superior street	
1	6 inch	Street 286 feet west of Oliver street	East	South line Superior street	
13	6 inch	For hydrants.			
147		Total 6 inch stop gates.			
1	4 inch	Avery	South	East line Lester street	
1	4 inch	Culver	East	North line Schott street	
1	4 inch	Ewald	South	East line East Madison avenue	
1	4 inch	Foljambe	East	North line Cypress street	
1	4 inch	Jerome alley	North	West line Cross street	
1	4 inch	Mabel	South	East line Franklin court	
1	4 inch	Magnet	East	North line Broadway	
1	4 inch	Pleasant	East	691 south of Clark avenue, and 80 feet west of east line Pleasant street	Connection valve.
1	4 inch	Sago	East	South line Sibley street	

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1884—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	4 inch....	Sago	East......	North line Cedar avenue	
1	4 inch.....	Walton	South.....	East line Pearl street	
208	4 inch ..	For hydrants			
219	....	Total 4 inch stop gates.			
3	3 inch....	For hydrants. Total 3 inch stop gates.			

RECAPITULATION OF STOP GATES FOR 1884.

Water way in inches	36	30	24	20	16	12	10	8	6	4	3	Total.
Set previous to 1884	4	32	8	17	21	21	97	274	942	1,532	216	3,164
Set in 1884	6	17	4	4	6	4	0	31	147	219	3	441
Total.	10	49	12	21	27	25	97	305	1,089	1,751	219	3,605
Taken out in 1884									1	18	12	31
Total in use Dec. 31, 1884	10	49	12	21	27	25	97	305	1,088	1,733	207	3,574

THIRTIETH

ANNUAL REPORT

—OF THE—

Water Works Trustees

—OF THE—

CITY OF CLEVELAND, O.

FOR THE YEAR ENDING DECEMBER 31, 1885.

AMERICAN SOCIETY
NOV 30 1886
OF CIVIL ENGINEERS,
NEW YORK.

CLEVELAND, O.:
[illegible] Printing Co.
1886.

PRESENTED BY John Whitelaw C.
M. Am. Soc. C. E.
Cleveland
Ohio

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PUBLIC LIBRARY
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ASTOR, LENOX AND
TILDEN FOUNDATIONS.
1902

REPORT OF THE TRUSTEES.

To the Honorable Mayor and Common Council of the City of Cleveland.

GENTLEMEN:—We have the honor to respectfully submit the Thirtieth Annual Report of the Trustees of Water Works together with the reports of the Officers of the Board.

The report of the Secretary is a comprehensive statement of the financial condition of the department. The net gain in receipts of $22,886.64 for the year is in itself very gratifying.

The report of the Superintendent and Engineer is complete and gives in detail a history of the management of the department in all its branches. We would especially call attention to that portion of his report which refers to the recent stoppage of the water supply. The facts and figures given by him in relation to the cause and his deductions therefrom seem to be convincing.

The citizens of the east and southeast parts of our city for the first time in history by the completion of the high service system during the past year have a bountiful supply of Lake Water and we hope that they will avail themselves of its use for all purposes both public and domestic. The Fire Department appreciate to the fullest extent the aid given them by the improvement, the immediate effect of which should be to materially lessen the cost of Fire insurance. The same may be said of all portions of the city which by the building of Fairmount Reservoir and the additional pressure upon the pipe system necessary to deliver the water there affords an increased fire protection, the advantages of which cannot be over estimated.

Respectfully submitted,

PERCY W. RICE,
WM. H. LUTTON.

REPORT OF THE SECRETARY.

Office of the Secretary of Water Works,
CLEVELAND, OHIO, Feby. 6, 1886.

To the Honorable Board of Trustees of Water Works:

GENTLEMEN:—I have the honor to respectfully submit this the Thirtieth Annual Report upon the financial condition of this department, for the year ending December 31, 1885.

GROSS RECEIPTS.

For water measured	$[illegible]	
For water from regular assessments	[illegible]	
For water from miscellaneous sources	[illegible]	
For [illegible] connections to main pipe @ $[illegible]	[illegible]	
		$[illegible]
For bonds sold to Cleveland Sinking Fund		[illegible]
For interest		[illegible]
For account of pipe extension	[illegible]	
For account of high service reservoir	[illegible]	
For account of high service engine	[illegible]	
For account of water meters	[illegible]	
		[illegible]
For account of [illegible] repairs	[illegible]	
For account of engine house [illegible]	[illegible]	
For account of engine house repairs	[illegible]	
		[illegible]
Cash on hand January 1, 1885	[illegible]	
Cash in City Treasury January 1, 1885	[illegible]	
		[illegible]
Total		$[illegible]

DISBURSEMENTS.

Returned water Rent	$ 774 28	
Ferrules, &c., and cost of tapping 1585 connections	3,557 33	
		$ 4,331 61
Office and general expenses	22,841 04	
General repairs	6,164 12	
Engine house expenses	42,352 69	
Engine house repairs	2,768 21	
		74,126 06
Rebuilding crib superstructure and opening inlet		40,731 03
Account of pipe extension	223,377 00	
Account of Fairmount Reservoir	112,845 37	
Account of High service reservoir	14,968 61	
Account of high service engine house	62,814 94	
Account of high service engine	10,898 84	
Account of water meters	10,372 36	435,277 12
Balance cash in office January 1st, 1886	1,281 24	
Balance cash in City Treasury January 1st, 1886	55,350 36	56,631 60
		$ 611,097 42

From the above statements of receipts and disbursements is obtained the following

Received for water	321,992 67	
Less paid for returned water rent and tapping	4,331 61	317,661 06
Received for interest		1 45
Received for bonds		275,000 00
Cash on hand January 1 1885		11,574 67
		$ 604,237 18
Paid for operating expenses	74,049 71	
Paid for rebuilding crib superstructure	40,731 03	
Paid for Permanent Improvements	432,824 84	547,605 58
Balance, cash subject to draft January 1 1886		56,631 60
		$ 604,237 18
The net earnings of the year, 1885, are	243,612 35	
The net earnings of the year, 1884 are	220,725 71	
Net gain in favor of 1885	$ 22,886 64	

Assuming the increase to be in the same proportion

I would estimate the revenue for water for 1886, at	340,000 00
Operating expenses, high and low services	85,000 00
Leaving available for other purposes	255,000 00

In connection with the above estimate, permit me to call your attention to Council Ordinance No. 202, which before its passage was referred to your Honorable Board and by you approved. Said ordinance provides that the surplus earnings above the cost of conducting, managing, repairing and extending the works, as you may decide it to be a surplus, shall be paid to the Sinking Fund Commissioners, to be used in extinguishing the water works debt and for no other purpose whatever. And I would respectfully suggest that your expenditures for the year on which we have now entered, if practicable be so regulated that a part of the available earnings, small though it may be, be applied as contemplated by this ordinance. "The only way to resume is to resume."

The bonded debt of the water works is $1,775,000, of which seven hundred and seventy-five thousand dollars is held by the Cleveland Sinking Fund Commissioners.

The interest on the whole amounts to $108,150.00 per year, or $9,000.00 per month, or $300.00 per day, or $12.50 per hour, and amounts to nearly four thousand dollars more than the entire operating expenses of the department for last year.

LEDGER BALANCES AT THE CLOSE OF BUSINESS.

December 31, 1885.

Face of Ledger.	Debit.	Face of Ledger.	Credit.
Cash	$ 1,281 [illegible]	Water rent	$2,018,735 36
City Treasurer	55,380 [illegible]	City of Cleveland	68,171 26
Interest	140,490 64	Bonds redeemed	925,000 00
Construction	3,925,113 [illegible]	Bonds outstanding	1,775,000 00
Fairmount Reservoir	355,989 40		
Kinsman Reservoir	125,454 02		
High service pumping house	84,965 75		
High service engine	35,085 01		
Water meters	52,517 15		
Total	$4,786,906 62	Total	$4,786,906 62

THE BONDED DEBT IN DETAIL.

When Due.	Amount.	Rate.	Annual Interest.
May 1, 1892	$ 400,000 00	7 per cent.	$28,000 00
May 1, 1893	200,000 00	7 per cent.	14,000 00
October 1, 1896	200,000 00	6 per cent.	12,000 00
September 1, 1897	500,000 00	6 per cent.	30,000 00
September 1, 1900	275,000 00	6 per cent.	16,500 00
September 1, 1902	100,000 00	3.65 per cent.	3,650 00
September 1, 1902	100,000 00	4 per cent.	4,000 00
Total	$1,775,000 00	Total.	$108,150 00

The construction account as shown in the Ledger, is made up of the following parts:

	Cost.	Per Cent.
Reservoir, Franklin street, 6,000,000 gallons capacity and grounds, 6 acres	$ 84,852 13	01.85
Engine house grounds, old river street and old river bed, 4 acres	54,356 45	01 20
Two engine houses containing 4 pumping engines with space for two more, providing for a combined daily pumping capacity of 70,000,000 gallons	250,069 97	5.48
Four compound-duplex pumping engines and boilers, etc., of a combined daily pumping capacity of 40,000,000 gallons	278,309 20	6.09
Lake Crib, shafts and tunnel from crib to pumps. One mile 3,940 feet long, 5 ft. 4 in. in diameter, 40,000,000 daily capacity	509,519 51	11.16
The pipe system consisting of 23 miles 1,399 feet main pipe; 189 miles 89 feet distributing pipe; total 212 mi's 1,488 ft; 1985 fire hydrants	2,665,906 30	58.34
1,098 water meters set on services in good repair and protected from frost	52,815 15	1.16
Fairmount storage reservoir, 75,000,000 gallons capacity	332,949 91	7.73
High service reservoir, 35,000,000 gal's. capacit	128,450 02	2.81
High service engine house enclosing one pai Cornish engines, 6,000,000 gallons pumpin capacity daily	190,844 74	4.18
Total	$4,560,374 38	100

The following table shows the receipts for water from the beginning of the works, also the operating expenses and repairs. The difference which with equal propriety, may be called profit and loss, net earnings, surplus or net water rent, corresponds with the water rent account as contained in the Ledger.

Years.	Receipts for Water.	Running Exp's	Repairs.	Receipts Less Expense and Repairs.
1856 to 1860	51,322 33	37,529 29	4,730 46	9,062 58
1861 "	17,097 85	7,768 36	1,350 84	7,978 65
1862 "	22,730 53	8,086 18	1,291 29	13,353 06
1863 "	23,421 30	10,011 96	835 54	12,573 80
1864 "	33,389 49	13,573 29	1,953 49	17,862 71
1865 "	40,888 01	17,346 56	1,382 21	22,159 24
1866 "	45,363 70	14,277 13	8,818 77	22,267 80
1867 "	51,862 45	14,246 06	3,685 79	33,930 60
1868 "	57,297 98	17,304 32	3,653 43	36,340 23
1869 "	62,860 72	18,880 13	3,290 56	40,690 03
1870 "	70,411 18	19,725 24	9,823 99	40,861 95
1871 "	80,487 44	24,382 16	10,155 33	45,949 95
1872 "	90,243 96	26,951 65	6,953 49	56,338 82
1873 "	108,431 00	38,218 30	3,673 07	66,539 63
1874 "	116,433 08	48,951 79	9,515 99	57,965 30
1875 "	114,602 13	57,890 17	11,306 26	45,405 70
1876 "	140,925 87	51,481 59	15,956 86	73,487 42
1877 "	152,794 68	50,571 46	20,673 36	81,549 86
1878 "	160,125 70	47,183 44	22,453 91	90,488 35
1879 "	182,173 33	44,616 56	11,182 61	126,374 16
1880 "	202,377 92	47,618 70	8,296 13	146,463 09
1881 "	233,981 71	56,430 19	8,586 07	168,965 45
1882 "	248,979 06	57,857 47	7,925 56	183,196 03
1883 "	274,014 15	61,047 58	11,583 24	201,383 33
1884 "	296,392 60	66,196 41	9,470 48	220,725 71
1885 "	317,061 06	64,550 73	55,498 35	197,011 98
Total ...	$3,196,788 23	$923,806 79	$254,246 08	$2,018,735 36

In the repairs of 1885, in the foregoing statement, the following items make the account.

General Repairs	6,152 52
Engine house repairs	1,746 46
Rebuilding Crib Superstructure	40,731 03
Ten per cent of Water meter account, charged to depreciation	5,868 34
	55,498 35

In including the last two items in the Repairs account; the net earnings are decreased to that extent. The object in so doing is to have the Lake Crib and Water meter accounts as given in the inventory represent as nearly as possible the true value of the property.

The following is a detailed statement of receipts from other sources than that of water.

1885.				
January	16,	Lake Shore Foundry, for scrap	$ 155 94	
	20,	Valley Railway, Fire hydrant	38 06	
	27,	H. J. Ready, Elevator connection	93 83	
		E. Rosenfield, 4 in. Connection in Bank street	86 13	
				393 90
February	2,	Geo. S. Paine. Connection in Erie street	25 67	
	4,	Fries & Schuele, 4 in. Elevator conn. Pearl street	95 84	
	10,	Standard Oil Co., one 1 in. Meter	33 28	
		Smith & Connors, 1 valve box cover	77	
	14,	Sherwin, Williams & Co., 2 in. Conn. Lime street	14 11	
		Daniel Masters, ashes from engine house	3 00	
	18,	H'P. Nail Co., two 4 in. connections, Lake street	353 26	
	21,	Theo. Kuntz, connection to pipe in Elm street	22 02	
	27,	A. McCallister connection in Newton street	44 73	
				572 39
April	2,	Cleveland Storage Co., 2 in. conn. in Scranton Ave.	138 04	
	8,	Weil, Joseph & Co., four in conn. on St. Clair st	57 55	
		A. Gerdum, 19 lb. lead	76	
				1,162 94
	21,	C. & P. R. R. repairing hydrant	34 32	
	22,	W. P. Braund, 676 lb. water pipe @ 1¼	8 45	
				290 82

May	5,	Standard Oil Co. seven oil barrels	7 00	
	12,	Robt. Wallace, one ¾ in. meter	25 41	
				32 41
June	1,	F. Muhlhauser, connection at Woolen Mills	10 66	
	8,	W. F. Thompson, 370 lb. scrap	3 70	
	9,	C. C. Dewstoe, conn. for Leslie Sewing Mach. Co.	25 78	
	18,	A. G. Harrison, sprinkler T. 370 lb. @ 2¾	10 17	
				50 31
July	10,	R. Doty, cash for old brick	8 00	
	31,	John ODonnell, 10,090 lbs. scrap @ $12 per ton	60 54	
		John ODonnell, 1,000 lbs. scrap @ $12 per ton	6 00	
		John ODonnell, 6,300 lbs. scrap @ $5 per ton	15 75	
				90 29
August	13,	V. P. Mathivet, conn. for city hall elevator	33 58	
	18,	Potter Birdsall & Co., connection in Carter street	44 43	
	19,	Smith & Connors, 2 in. conn. to 8 in. pipe, Lake st.	23 03	
	20,	Frank Wachnitz, for stone	8 00	
	22,	Carl Samuel, error in wages	1 87	
	25,	A. T. Brinsmade, Interest on judgement	1 45	
		Smith & Conners, connection for Atwater block	24 72	
	31,	Clev'd. Transp. Co., rent of dock season, 1884-1885	40 00	
				177 08
Sept.	1,	E. M. Quimby, conn. to building, Euclid avenue	236 49	
	5,	W. H. Doan, 4 in. connection Erie street	91 80	
	10,	Geo. S. Paine, 2 in. connection, Case school	33 98	
	12,	C. & P. R. R. repairing hydrant	6 53	
	21,	Herman Gutsky, error in wages, credited back	18 00	
	30,	Woods, Perry & Co., 6 in. connnection Carter street	52 35	
				439 15
October	3,	Dewstoe & Schneider, connection, Bright street	8 06	
	22,	S. H. & E. Bloch, changing pipe, Water steet	4 14	
	23,	E. Bingham, changing pipe, Water steet	4 50	
	30,	A. Hemmingway, old cement pipe, St. Clair street	5 00	
				21 70
				$ 2,017 25

November 3,	Clev'd Rolling Mill Co. connection, Carter street..	31 21	
	Cleveland Rolling Mill Co. 2 in. meter................	53 53	
4,	R. Doty, cash for old brick....................................	71 20	
10,	Fred Dowley, 100 feet old cement pipe	1 00	
20,	Mr. Weeks, 100 feet old cement pipe.....	1 00	
28,	Brush Power Co., connection, Lime street......... ..	22 89	
			180 83
December 10,	John Whitelaw, cartage returned..........................	50	
14,	Britton Iron & Steel Co., enlarging connection....	24 46	
18,	Dewstoe & Schneider, 4 in. cylinder valve box.....	60	
26,	L. S. & M. S. R. R., for fire connection...........	128 72	
30,	A. S. Dietrichs & Co., 1,613 lbs. old brass. @ 8¼. ..	133 07	
	L. Schlather, for 4 in. connection, Carroll street...	40 05	
	City Treasurer, retained on warrant.....	4 60	
			342 00
			$2,530 08

All of which is respectfully submitted.

WILLIAM A. MADISON,

Secretary.

Superintendent's Report.

REPORT OF THE

SUPERINTENDENT AND ENGINEER

To the Board of Trustees of Water Works:

GENTLEMEN:—The Thirtieth Annual Report of the Superintendent and Engineer of the Water Works, is herewith respectfully submitted.

LAKE CRIB.

Proposals were received April 28th, for rebuilding the superstructure of the protection Crib at the inlet shaft of the lake tunnel and the contract awarded to Messrs. Scott & Downer, lowest bidder.

Work was commenced in June and prosecuted during such time as the condition of the lake would permit. The progress made up to the time the timber work had reached a height of six feet above the water line was slow, owing to the unusually disturbed condition of the lake for the season of the year.

During the month of August there were only seven days when work could be carried on.

On the 7th of September, a violent storm broke away some of the new timber and washed the filling from the crib, landing the stone in the lake against the southwest wall and nearly closing the inlet leading through the crib to the tunnel shaft. Divers were immediately set to work to clear the inlet, but owing to rough weather the progress was slow and the work was not completed until late in October. Fortunately the demand for water was light and the supply was ample for the time.

After the old superstructure had been removed, it was found that a good deal of work would have to be done under water that was not, and from its nature could not be anticipated, this was done as the work progressed. The outer wall was further strengthened by upright timbers extending from below the water to the floor line, these were bolted to each course, thus binding all firmly together. The wall over the well was also strengthened so that should the timber work be destroyed this would remain to protect the inlet shaft. These additions, the price for which was stipulated in the contract, increased the cost of the work very materialy above the estimate, but I believe they were wisely made, as upon the stability of this structure depends the water supply of the city.

The whole work was fully completed in November.

The cost of rebuilding and of clearing the inlet, is shown in the Report of the Secretary.

TUNNEL.

With the exception noted in my last annual report of a partial stoppage of the flow of water through the crib inlet by cake ice for a few moments in January, 1885, the supply has been uninterrupted.

On the 13th and 14th of January of the present year, all of the four pumps at the lower pumping station had to be kept running to supply the demand, the delivery being at the rate of 34½ million gallons in 24 hours, the conditions being favorable a large quantity of slush or sludge, the result of the recent heavy snow storm, was drawn into the crib well and thence to the inlet shaft. By noon on the 14th, the inlet had become so much obstructed that only two pumps could be run, and by 4 o'clock P. M., scarcely any water reached the wells and all the pumps were stopped. In the mean time the crib keeper with a force of men, was at work using every effort to dislodge the floating mass about the inlet, not being successful in carrying on the work from the surface. Walter Metcalf, the keeper, returned to shore on the morning of the 15th for a diver's outfit, but finding difficulty in getting it out over the rough ice that extended from the harbor out to the crib, had to clear a track along which to haul the outfit on sleds. Reaching the crib about noon he descended to the top of the inlet shaft and soon had an opening made large enough to afford water for two pumps, and by 4 o'clock P. M., had removed all obstruction, since then no further trouble has occurred.

I believe the cause of the choking of the inlet may be readily understood when the combination of conditions that prevailed before and during the stoppage of the flow of water is considered.

From the evening of the 8th to the evening of the 9th, snow fell to the depth of 10 7-10 inches, while no ice was on the lake, during this time the mean temperature of the air was 19 1-10°, while that of the water taken at the pump wells was 34°. On the evening of the 8th, the wind was from the N. E., on the morning of the 9th, it had changed to N., and by noon was from the N. W., where it continued until the morning of the 10th, when it turned to W., and remained so all day. On the 11th and morning of the 12th, it was from the S. W., after which time it changed to S., and so continued until the trouble was over. The mean temperature of the air on the 10th, was 5.0° F., of the water 32°, on the 11th, air 0.7°, water 32°, on the 12th, air 3.4°, water 34°, on the 13th, air 9.3°, water 34°, on the 14th, air 19°, water 34°.

It will be seen that a heavy snow fall took place while the lake was not yet frozen over, and accompanied by low temperature of air and water, that the direction of the wind, until the morning of the 11th, was such as to drive the unmelted snow, and thin, newly formed ice, toward the shore, filling the water to the bottom of the lake, for nearly a mile out, with slush or sludge ice, and after the surface was frozen over to hold it there. The newly formed surface ice was covered with balls of this same slush ice ranging in size from an egg to a flour barrel, covered with a thin crust of hard ice, these when broken fell to pieces like a dry snow ball. Many of them bore evidence of having been on shore at least two miles west of the tunnel, as they carried gravel and flakes of blue shale rock, from the bluffs to the west, frozen in their surfaces. Numbers of them were found inside of the crib well and in the inlet to the shaft. By noon on the 12th, the wind had shifted to the south, the field of ice began to move out and wide cracks appeared in shore from the crib, as it moved out and broke against that structure. The slush ice was packed against it and drawn into the well by the unusual current then running, finally clogging the inlet to the tunnel for a distance of three feet below the top of the shaft, and twelve feet below the surface of the water. The timber cap, over the inlet shaft, under which were two openings for the passage of water into the shaft, each thirty inches by seven feet, has been removed. Its purpose was to prevent any large substance or body from falling or being drawn into the tunnel, and should be replaced by a movable cap of different construction.

OLD INLET.

As a present precaution against another water famine I would recommend that the old aqueduct, abandoned when the shore tunnel was completed, be cleaned out and put in readiness for use. Although the water taken through it would be objectionable for domestic use, owing to its inlet being near the outflow of one of the largest main sewers on the west side, it would be better than that from the River Bed, and would answer for manufacturing purposes and fire protection. The quantity it would deliver would not be sufficient for the maximum demand, but would be enough to prevent an absolute water famine.

BUILDINGS.

No work of any importance has been required on either of the buildings at the west side pumping station. Some repairs were made on the roof of the north building and the iron fences between the buildings that were disturbed by pipe trenches were reset and painted, as were all the other fences inclosing both lots.

HIGH SERVICE ENGINE HOUSE.

This building is so nearly completed that both engines are in place and one of them has been in use since the first of December. The general dimensions are given in my last annual report.

It is expected that the entire work will be completed by the first of March.

MACHINERY.

The three ten-million-gallon Worthington engines are all in good repair and doing their work with the usual economy. The Henderson engine of the same capacity, is also in good order and ready for service whenever necessary.

Extensive repairs have been made to the Marine boilers in the south building, a more particular description of which will be found in the report of Mr. Doty, Engineer in charge.

The experiments made at the pumping works in the early part of the year, for the purpose of reducing the great volume of smoke that had for years been the cause of loud complaint from residents in the vicinity, have resulted not only in suppressing the greater portion of the smoke, but in an increase of nearly twenty per cent. in the capacity of the boilers.

The Smoke Inspector has reported the nuisance abated.

CORNISH ENGINES.

These engines have been successfully removed and placed in the new High Service engine house. Such parts as required repairs have been put in first class order.

The main journals were found to be badly worn and cut. These were turned down sufficiently to remove all cuts. The bottom half of some of the boxes were so much worn that they had to be replaced with new ones. A new lower valve chamber has been placed in the east pump.

The stand pipe, with the exception of the cast iron base, is all new and made of steel.

Other minor repairs have been made, making these engines and pumps as good as they ever were and, resting as they do on a rock foundation, should last for fifty years to come.

They now work with great ease and smoothness, the jar and vibration so noticable while working in the old building has entirely disappeared. Instead of having a suction lift of about 14 feet as they had at the old works, they now have a head on the suction equal to the depth of the water in Fairmount reservoir. To relieve the suction pipe from water hammer an open stand pipe is placed in it, in the building, the top of which is a little above the top of the reservoir embankment. These arrangements enable the pump valves to seat without shock or noise and must add greatly to the durability of their seats.

The same boilers, fitted with smoke preventers. are used as in the old works. They are working up to the highest expectations entertained regarding them, and I have no doubt that a trial will prove the duty to be greater than ever before shown, for the engines as well as the boilers. All the conditions are so much more favorable than in the old building, that the result cannot be otherwise.

FRANKLIN STREET RESERVOIR.

This reservoir has been in use during the year until the morning of November 29th, when the gates in the pipes leading into it were closed, and at the same time those controlling the flow of water into the new Fairmount reservoir were opened, since which time all the surplus water has been pumped into the latter reservoir.

The old reservoir has, however, been kept filled and ready for use should anything occur to require the temporary abandonment of the new one. During the recent stoppage of the flow of water through the tunnel by slush ice, a watchman was stationed there, ready at call from the Fire Department, to turn the water into the mains.

The question of whether this property shall be abandoned for water works purposes, is one that should be well considered before any definite action is taken, especially as its possible usefulness has so recently been made apparent.

FAIRMOUNT RESERVOIR.

This reservoir was so far completed by the end of November that the gates in the inlet pipes were opened on the 29th, and water admitted, since which time it has been in constant use excepting during the brief interval noted.

Contracts have been let for the iron fencing and embankment railing, to the Van Dorn Iron Works of this city, and the work is now well under way. The foundation stones are nearly all in place and a large part of the fence is delivered on the ground awaiting favorable weather for setting.

The iron bridges leading to the valve rods are in place, although not yet completed. This work was let to Thos. Manning, Jr., of this city.

The stair railing is being build by Alexander McCormick, also of this city. The shop work for all these improvements is nearly completed, and will be put in place as soon as favorable weather will permit.

There are two small leaks in the north basin, but owing to the severe weather and icy condition of the slopes and bottom, nothing can be done at present to repair them.

The south basin has been tested to a height of 16 feet, and so far proves to be water tight.

Woodland Hills Ave., in front of the reservoir has, by reason of the heavy teaming over it, and the laying of pipe lines, been rendered almost impassible during wet weather, and should be regraded during the coming season.

Water diverted from its natural channel by a broken culvert on a highway just outside the city and south of Quincy St., has been permitted to flow past this property and down Norman street to Doan street, cutting the streets in front of the engine house and reservoir to such an extent as to make them dangerous for the passage of vehicles. The water having been restored to its former channel, repairs can be made as soon as grading can be done.

The engine house lot at this station should be graded and properly laid out, to harmonize with the other surroundings. The walks should be laid with flagging in front of the reservoir and engine house.

HIGH SERVICE RESERVOIR.

The embankments forming this reservoir are built entirely of tough, tenacious clay. It was laid on in layers six inches in thickness and abundance of water applied to each course, then rolled and driven over with teams. Notwithstanding these precautions the banks have settled, and are still settling, although they have been completed for more than a year and a half.

The stairs will require resetting when settlement ceases, and the top and slopes will need trimming to bring them to line.

The pavement has followed the settlement on the inner slopes and will need relaying in places. Nothing should be done, however, until all settlement stops.

Water has been pumped into this reservoir, at intervals, for the supply of the few consumers connected with the upper pipe system.

The depth thus far has not exceeded seven feet. It has not been thought expedient to increase this until the return of warm weather, especially as the pressure with that head is ample for all parts of the district in which pipe is now laid.

MAIN PIPES.

Main pipes have been laid during the year, in the low service district as follows: of 36 inch, for suction pipe for the high service pumping engine 36 feet; of 30 inch for suction pipes for the same engines, 153 feet; pumping main from No. 3 Worthington engine through old River, Taylor, Franklin, Harbor and Randall streets to Lorain street, with branch in Bridge street; east from Randall street to Kentucky street where it connects with the 30 inch main running east in Bridge street, making 5437 feet of pumping main and 153 feet of suction, a total of 5590 ft.; 34 feet of 24 inch was laid for overflow pipe for Fairmount reservoir. 2147 feet of 16 inch main was laid in Forest street from Scovill avenue south to Croton street, and 582 feet of Cement lined sheet iron pipe was taken up and relaid with cast iron in Franklin avenue between Pearl street and the Circle.

In the high service district 76 feet of 30 inch was laid to connect the stand pipe with the pumping main. At the high service reservoir 108 feet of 20 inch was laid for waste and overflow pipe; 3265 feet of 20 inch pipe was laid in Union street from Woodland Hills avenue west to Axtell street; a 20 inch branch was also laid in Way street west from Woodland Hills avenue 25 feet, making a total of 3,398 feet of 20 inch.

In Harvard street a 16 inch main was laid from Woodland Hills avenue west to Broadway, a distance of 1,760 feet' Branches of the same size were laid west from the main in Woodland Hills avenue in the following streets: Miles 58 feet, Kinsman 50 feet and south Woodland 48 feet or a total of 1,916 feet of 16 inch main.

I would recommend the extension of the 30 inch, now terminating at Lorain street, south through Burton street to Clark avenue, and east through Clark avenue to Pearl street a distance of 7,450 feet, during the coming year. This pipe is needed as a feeder for the distributing system of pipes in the southerly section of the low service district, and should in time be extended easterly to Willson avenue, and thence northerly to Scovill avenue, where it would connect with the 36 inch main now leading to Fairmount reservoir.

The 16 inch wrought iron pipe crossing under the river at Ohio street is still out of service. In November an effort was made to repair the leak mentioned in my last annual report. Upon examination being made by the diver, Mr. Walter Metcalf, it was found that in addition to being broken it was flattened to an extent to make it inexpedient to attempt to repair it with a sleeve as contemplated. Upon further examination a second hole six feet from the larger one was discovered. Both of them were, doubtless, made by dredging machines. Late in the season the 10 inch pipe crossing the river at Upper Central Way, was also broken by a dredging machine and a long section removed.

It is recommended that both of these pipes be taken up and that the one now at Ohio street be repaired and relaid at Central Way, and that a new one not less than 36 inches in diameter be made and laid at a depth below danger from any cause. The time is not far distant when a new main will have to be laid to take the place of the 16 inch, or to run parallel to it, and as the most convenient line between the pumping works and the section of the city to be supplied by this pipe is through Ohio street, one river pipe could carry the water delivered through both lines, as is now done at Superior street with the 20 inch and 30 inch mains.

DISTRIBUTING PIPES.

The increase in the mileage of pipes for distribution was 9 miles 4,808 feet in the low service district, and 3 miles 3,617 feet in the high service, making a total of 13 miles 3,145 feet.

The pipe relaid and lowered measured 2 miles 2,867 feet, and that lowered 5 miles 2,818 feet, a total of 8 miles 405 feet.

The total length of pipe in use of all sizes is as follows:

Low District, main pipe	17 miles,	4,509 feet.
" distributing pipe	185 "	1,641 "
High District, main pipe	5 "	2.170 "
" distributing pipe	3 "	3,728 "
Total	212	1,488

STOP GATES.

The addition to the number of stop gates for the year was 570, of this number 20 were set in main pipe lines, and 550 in distributing pipes and fire hydrant branches; 57 old ones were taken out and larger ones set in cases where pipe was relaid or to replace broken ones.

The total number in use at this time is 4,087; of this number 138 are in main pipe lines above 12 inches in diameter.

FIRE HYDRANTS.

The number of new fire hydrants added during the year was 280. The total number now in use is 1,986.

SERVICE PIPES.

The increase in the number of service pipes in use over 1884 is 1,448.

It will be noticed that the number of connections of the different sizes varies somewhat from the year 1884.

Last year a revision of all service connections was made and a uniform method adopted for recording services having two or more small taps connected with one service pipe; also where service connections have been abandoned and the numbers reissued and given to a different size.

CONNECTIONS.

Size.	Made previous to 1885, After Revision.	Made in 1885.	Totals.
⅝ inch	17,445	1,516	18,961
¾ inch	580	27	607
1 inch	72	5	77
1¼ inch	22	2	24
1½ inch	33	2	35
2 inch	146	11	157
2½ inch	3	0	3
3 inch	72	2	74
4 inch	99	9	108
6 inch	3	2	5
Total	18,475	1,576	20,051

Turned off for non-payment or other causes	691
Not extended beyond curb line	931
Abandoned and plugged	18
Total connections not in use Jan. 1st, 1886	1,640
Number in use Dec. 31st. 1885	18,411

WATER METERS.

The number of meters of the different sizes placed during the year was 112, of hydraulic elevators having registers, 6.

Total number of meters in use	1,098
" " elevators in use	72
" " water motors in use	5
Total devices for measuring water	1,175

METERS IN USE DECEMBER, 31st, 1885.

Name of Meters.	¾ in.	1 in.	1½ in.	2 in.	3 in.	4 in.	Total.
Worthington Piston....	557	266	100	95	49	24	1,091
Crown Rotary...............	....	3	....	....	....	....	3
Ball and Pitts Rotary..	2	....	....	1	1	....	4
Totals......................	559	269	100	96	50	24	1,098

The quantity of water measured by meters, hydraulic elevators and water motors during the year, was 1,239,793,170 gallons, or 3,396,693 gallons per day, an increase of 292,133 gallons per day, and 103,524,322 gallons for the year.

DISTRIBUTION.

The number of gallons of water pumped as shown by the record of the different engines, was 6,552,003,190, an increase over the previous year of 561,625,053 gallons.

The average daily supply for the year was, 17,950,694 gallons, an increase of 1,583,541 gallons per day over the year 1884.

The rate of increase was 9.37 per cent.

It will be seen that the rate of increase has been 6 1-10 per cent. less than for the preceding year. this is, doubtless, owing to the smaller number of connections made, and to the stoppage of the leak in the 16 inch river main.

The cost of pumping each million gallons 100 feet high was $4.26¼, or 71½ cents less than for 1884.

WASTE OF WATER.

Regarding the waste of water, I would again call your attention to the facts set forth in my last annual report. Additional argument might be used to induce you to institute a system of through inspection of plumbing, but your own observations for the past year should be sufficient to convince you of the necessity of some action being taken during the coming season. Should you deem it inexpedient to place any restrictions upon the use and waste of water, it will be necessary to begin making preparations for another tunnel, more machinery and main pipes, for, by the time these can be furnished the limit of the capacity now available will have been reached.

I would recommend that a shaft and two pump wells be built in the vacant engine room in the north building, and that a tunnel be run from the bottom of this shaft to connect with the present tunnel shaft, a distance of about 120 feet; this work must be done before new engines can be placed in the building.

The following is an approximate estimate of anticipated expenditures for the coming year.

Fairmount Reservoir, to complete, including Fencing, Bridges, Stair Railing, Grading street and Flagging..............	$ 41.750
High Service Reservoir, final estimate.....	13.800
High Service Engine House, final estimates	9.000
Cornish Engines......................	2.800
Main pipe...	35.000
Pipe for street distribution.....................	100.000
New pump wells, and connection with tunnel in North Engine House...........	22.650
	$ 225.000
Operating expenses, and ordinary repairs..	85.000
	$ 310.000
Estimated receipts for water	340.000
Surplus..	$ 30.000

Respectfully Submitted,
JOHN WHITELAW.
Superintendent and Engineer.

To the Superintendent and Engineer of Cleveland Water Works:

SIR:—The report of the Engineer of the Pumping Department of Cleveland Water Works, is hereby respectfully submitted.

CORNISH ENGINES.

The work of erecting the Cornish engines at the high service pumping station, has progressed as fast as circumstances would permit since my last report, and would have been ready for service early in December, had the building and the reservoir been completed.

The first test of the west engine was made December 29th, 1885. This test was quite satisfactory considering the circumstances under which this and several subsequent tests were made· I feel justified in saying that the engines will prove highly satisfactory when adjusted to their work. The east engine will probably be ready for service by February first 1886.

When the high service pumping station is completed as contemplated in the plans and specifications, the city will have added to its many substantial public improvements, an ornament which combines usefulness in the highest degree.

Allow me to express through you to the Board, my personal gratification for their hearty compliance with my suggestion, to appoint Mr. Andrew J. Aiken to take charge of this station. It is a well merited compliment to a faithful and competent man, and is highly appreciated by him.

HENDERSON ENGINES.

No considerable expense has been necessary on the Henderson engines this year. They are ready for service whenever the

Department shall need them. Economical motives prompt us to hold them in reserve most of the time.

NO. 1 WORTHINGTON ENGINES.

April 4th a fracture was discovered in the socket casting to the left hand pump plunger. This defective casting was replaced by a much heavier piece, the same as put in the other pump of this engine in 1883. We apprehend no further trouble from this source. Aside from the above mentioned change, nothing serious has happened to them. The time is approaching however, when this engine will require extensive repairs. No. 1 is running every day as usual, and no immediate attention will be necessary.

NO. 2 AND 3, WORTHINGTON ENGINES.

Reference to these engines seems hardly necessary, they have been kept in constant service with no expense aside from regular attendance, and the usual precautionary looking over twice every year. A reference to the schedule showing the work done by each engine, will speak more eloquently of them than any words of mine can express.

ENGINE SUMMARY.

The pumping capacity of the works remains the same as reported last year, viz.: 40 million maximum daily capacity. By reference to your engine tables, you will notice a large per cent. increased consumption over last year. The coming year this increase will be added to by the consumption in the district to be supplied by the High service system. If possible I would here emphasize the suggestion made in my last report, in reference to fill the old north side building with boilers and pumping machinery. I will abstain, however, from further remarks, believing that you will bring the matter before the Board in a more comprehensive manner then I shall be able to.

BOILERS.

One of the two boilers referred to in my last report as needing extensive repairs, has received such attention as it required. The other is still in service, and will safely run until spring, when we propose giving it the necessary overhauling. All the other boilers are in good repair, and in regular service. Some expense in connection with the boilers has been incurred, in experimenting with smoke preventers. The first two boilers tried, were fitted with a Hopper feed, a device constructed from plans of my own, which have shown a marked improvement over the old method of opening the doors to introduce the fuel, but the expense of any such device is a fatal objection to its adoption. We then turned our attention to the steam jet principle, which after many experiments has proved the most satisfactory. I hesitated about introducing the steam jet smoke preventer, knowing that engineers generally believed that it could not be done without loss. I am free to say, after many careful evaporation tests, that it is a delusion. Every test that I have made has shown a saving over the old style of imperfect combustion, and I believe the saving shown will more than pay for the introduction and maintenance of the device, which cost very little more than the ordinary bridge wall.

April 16th the city Smoke Inspector pronounced our effort in preventing smoke, satisfactory to him. We shall, however, continue to use every expedient that experience may dictate, to make our combustion more perfect, and endeavor to do our part toward ridding the city of the smoke nuisance.

SCHEDULE

Showing gallons of water pumped and coal consumed in pumping, per centage of coal consumed, and water pumped by each engine; contract price of coal, coal consumed, and cost of coal for raising 1,000,000 gallons into Reservoir.

Engine.	No.	Water pumped by Different Engines.	Pounds of Coal Consumed by Different Engines.	Per cent. of Water Pumped by different Engines.	Per cent. of Coal Consumed by the Different Engines.	Per cent. of Coal Consumed by Different Engines, Pumping 1,000,000 Gallons into Reservoir.	Contract Price of Coal.	Cost of Coal for Pumping 1,000,000 Gallons into Reservoir.	Year.
Worthington	1	1,437,853,780	5,127,480	21 94	24 35	23 79	1 50	$2 67	1885
Worthington	2	2.217,624,680	6,667,610	33 85	31 66	20 05	1 50	2 25	1885
Worthington	3	2,626,510,960	7,778,940	40 09	36 99	19 78	1 50	2 22	1885
Henderson	1	270,001,770	1,472,900	4 12	7 00	36 38	1 50	4 09	1885

Respectfully submitted,

R. DOTY,

Engineer in charge.

WORTHINGTON DUPLEX ENGINE NO. 1 RECORD FOR 1885.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped	Height in Feet and Dec.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	16	376	....	195,165	5,400	378,650	384,050	121,002,300	160.640	42,336,506
February	28	672	....	373,963	10,000	864,050	874,050	231,857,060	160.064	35,639,712
March	7	156	....	79,861	14,000	219,500	233,500	49,513,820	160.296	28,433,341
April	17	249	....	127,228	23,000	287,900	310,900	78,881,360	159.054	33,757,494
May	24	366	15	184,783	....	400,000	400,000	114,565,460	158.664	38,021,000
June	23	213	30	105,375	60,000	184,250	244,250	65,332,500	158.507	35,463,235
July	6	55	30	30,339	20,000	60,150	80,150	18,810,180	159.277	31,272,297
August	25	214	35	112,643	62,000	208,900	270,900	69,838,660	159.130	34,321,752
September	27	264	40	129,021	61,000	241,600	302,600	79,993,020	161.820	35,778,087
October	29	522	15	261,840	28,000	486,900	514,900	162,340,800	158.977	41,914,958
November	30	720	....	342,594	1,600	705,500	707,100	212,408,280	158.830	39,902,104
December	31	717	45	376,307	3,800	800,800	804,600	233,310,340	184.000	44,629,944
Totals and averages	263	4,527	30	2,319,119	289,400	4,838,000	5,127,400	1,437,853,780	161.656	37,929,273

WORTHINGTON DUPLEX ENGINE NO. 2 RECORD FOR 1885.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped	Height in Feet and Dec.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	31	725	30	390,076	....	594,750	594,750	242,847,120	159,973	54,422,945
February	28	656	15	366,526	....	683,310	683,310	227,246,120	160,676	44,704,525
March	31	744	....	402.883	4,000	851,650	855,650	249,788,080	160,570	39,217,007
April	28	661	30	330,364	....	591,450	591,450	204,825,680	159,360	46,175,331
May	24	565	30	267,518	....	510,050	510,050	165,861,160	158,587	43,140,886
June	30	720	....	350,267	....	660,700	660,700	217,165,540	158,309	43,523,627
July	31	744	....	389,912	....	681,000	681,000	241,745,440	159,097	47,243,170
August	31	744	....	337,353	....	612,900	612,900	209,158,860	158,841	45,331,018
September	30	694	45	313,635	....	575,400	575,400	194,453,700	161,858	45,766.659
October	15	329	45	136,096	....	278,400	278,400	84,379,520	159,228	40,361,601
November	1	14	....	7,354	2,000	14,000	16,000	4,559,480	158,000	37,662,184
December	23	546	....	284,829	9,000	599,000	608,000	176,593,980	184,000	44.704,006
Totals and averages	303	7,145	15	3,576,814	15,000	6,652,610	6,667,610	2,217,624,680	161,542	44,931,162

WORTHINGTON DUPLEX ENGINE No. 3, RECORD FOR 1885.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped	Height in Feet and Dec.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January	31	738	45	306,561	....	613,600	613,600	245,241,620	159.965	53,491,504
February	28	672	....	375,571	....	763,350	753,350	232,854,020	160,685	41,004,690
March	31	744	....	410,340	2,000	912,930	914,930	254,410,800	160,570	37,365,161
April	26	608	20	312,032	2,000	596,820	598,820	193,459,840	160,000	43,238,396
May	29	669	45	326,218	....	558,060	558,060	202,255,160	158,689	48,112,377
June	30	720	....	354,187	....	668,150	663,150	219,596,940	158,319	43,847,795
July	31	744	....	390,976	....	652,100	652,100	242,405,120	160,110	49,471,161
August	31	744	....	358,671	....	567,880	567,880	209,976,020	158,833	49,115,398
September	30	720	....	327,671	....	552,110	552,110	203,156,020	161,191	49,616,375
October	31	744	....	343,190	....	617,400	617,400	212,777,800	158,951	45,836,672
November	30	720	....	337,743	....	652,000	652,000	209,400,600	158,670	42,634,712
December	27	648	....	334,158	4,000	631,550	635,550	200,977,960	164,000	48,671,448
Totals and Averages.	355	8,422	50	4,298,308	8,000	7,780,940	7,788,940	2,636,510,960	161,563	45,582,549

HENDERSON DUPLEX ENGINE, RECORD FOR 1885.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped	Height in Feet and Dec.	Duty.
		Hrs.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
January..................................	2	39	15	18,457	1,000	41,000	42,000	10,317,463	159,703	32,821,501
March....................................	25	586	45	317,848	....	964,800	964,800	177,677,032	160,537	24,729,011
April.....................................	10	85	10	45,263	22,000	121,550	143,550	25,302,017	159,983	23,593,786
July.......................................	19	181	45	101,462	73,000	249,550	322,550	56,717,258	159,465	23,464,240
Totals and averages....	56	892	55	483,030	96,000	1,376,900	1,472,900	270,013,770	159,922	24,524,461

SCHEDULE

Showing the Distribution of Water for each Day and Month in the Year 1885.

Months.	Gallons of Water pumped by Henderson Engine.	Gallons of Water pumped by Worthington Engine No. 1.	Gallons of Water pumped by Worthington Engine No. 2.	Gallons of Water pumped by Worthington Engine No. 3.	Gallons Distributed.			
					Per Month.	Average per Day.	Each Inhabitant per Day.	Each Consumer per day.
January	10,317,463	121,002,300	241,847,120	245,241,620	618,408,503	19,948,661	103.9	154.78
February		231,857,060	227,846,120	232,854,020	691,957,200	24,712,757	128.71	191.75
March	177,677,032	49,513,820	249,788,080	254,410,800	731,389,732	23,593,217	122.88	183.06
April	25,302,017	78,881,360	214,825,680	183,459,840	502,468,897	16,748,963	87.23	129.96
May		114,565,460	165,861,160	202,255,160	482,681,780	15,570,380	81.09	120.81
June		65,332,500	217,165,540	219,585,940	502,083,980	16,736,466	87,17	129.88
July	56,717,258	18,810,180	241,745,440	242,405,120	559,677,998	18,054,129	94.03	140.08
August		69,838,600	209,158,800	209,976,020	488,973,540	15,773,340	82.15	122.39
September		79,993,020	194,453,700	203,156,020	477,602,740	15,920,091	82.91	123.52
October		162,340,800	84,379,520	212,777,800	459'498,120	14,822,520	77.20	115.01
November		212,408,280	4,559,480	209,400,660	426,368,420	14,212,281	74.02	110.27
December		233,310,340	176,593,980	200,977,960	610,882,280	19,705,880	102.63	152.90
Totals and Averages	270,013,770	1,437,853,780	2,217,624,680	2,626,510,960	6,552,003,190	17,950,694	93.49	139.28

SCHEDULE

Showing the Total and Average quantities of Water pumped each year since the beginning of the Works.

Years.	Gallons Distributed.				Per Cent. of Increase.
	Per Year.	Per Day.	Each Inhabitant per Day.	Each Consumer per Day.	
1857	127,262,265	348,664	7.75	110.68	....
1858	142,155.434	398,467	8.37	93.44	11.70
1859	198,284,090	513,107	11.31	91.27	39.45
1860	260,220,354	710,984	14.11	105.57	31.87
1861	322,175,022	881,599	16,32	114.50	23.81
1862	369,673,092	1,012,794	19.47	120.57	14.74
1863	420,790,875	1,152,875	20.97	117.54	12.83
1864	476,114.225	1,300,858	21.68	123.89	12.14
1865	577,261,005	1,417.153	21.80	122.70	8.64
1866	587,372,220	1,609,239	22.35	124.26	13.55
1867	696,369,375	1,907,861	23.85	115.98	18.55
1868	768,786,975	2,106,265	24.77	116.08	10.40
1869	898,936,425	2,462,839	27.36	120.20	16.92
1870	1,126,228,500	3,085,558	30.86	113.20	25.28
1871	1,367,621,100	3,746,907	35.68	124.90	21.43
1872	1,686,370,895	4,607,571	40.07	131.64	22.67
1873	1,869,768,835	5,095,230	43.06	137.71	10.85
1874	2,050,252.910	5,625,150	45.36	141.10	9.65
1875	2.216,775,816	6,073,358	44.00	136.65	8,12
1876	2,399.225,403	6,573,220	49.22	131.28	8.23
1877	2,820,326,074	7,726,920	55.91	142.24	17.55
1878	2,892,946,823	7,925,882	51.13	135.05	2.57
1879	3,455,271,981	9,466,498	62.69	145.61	19.43
1880	3,725,683,021	10,179,461	65.25	145.23	7.82
1881	4,847,209,363	13,280,025	76.76	162.34	30.10
1882	4,494,538,536	12,313,804	68.41	136.04	7.27
1883	5,187,432,657	14,212.144	75.60	136.80	15.41
1884	5,990,378,137	16,367,153	82.66	137.83	15.47
1885	6,552,003,190	17,950,694	93.49	139.28	9.37

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
	36 in.	High Service Pump Works	Section pipe in building	35	35	
	30 in.	High Service Pump Works	Section pipe in building	34		
	30 in.	High Service Pump Works	From 30 inch "Y" connecting N. & S. basins of Fairmount Reservoir to 36 inch suction pipe	95		
	30 in.	Fairmount Reservoir	In N. basin to connect with outlet chamber	24		
South	30 in.	Bridge	T in Randall to T in Kentucky st.	750		
West	30 in.	Burton	Curve at N. L. Lorain st. to 36 feet S. of Lorain	111		
South	30 in.	Franklin	Curve at E. L. Taylor st. to E. end of curve at N. L. Harbor st.	296		
West	30 in.	Harbor	Curve at S. curb at Franklin ave. to curve at N. L. Woodbine st.	432		
South	30 in.	Old River	W. end of 30 to 12 T. at Taylor st. to 38 feet E. of W. L. Water Works property	191		
West	30 in.	Randall	Curve at Woodbine st. to N. L. Lorain st.	1,616		
East	30 in.	Taylor	T. in old River st. to curve in Franklin ave. at E. L. Taylor st.	2,041		
					5,590	
	24 in.	Fairmount Reservoir	Overflow pipes of N. & S. basins	34	34	

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft.Laid	Total.	Remarks.
North...	16 in,	Franklin.............	75 feet W. of Pearl st. W. to 16 inch valve at Circle..................................	582		16 in. cement. Relaid.
West....	16 in.	Forest..................................	36 feet S. of Scoville ave. to 18 feet N. of S. L. Croton st.........................	2,147	2,729	
	12 in.	Franklin..............................	Between 30 and 12 inch pipe 24 feet E. of Taylor st..................................	16		
West....	12 in.	Forest..........................	18 feet N. of S. L. Croton st. to N. L. of Broadway..................................	3,093		
South...	12 in.	Old River...........	30 inch pipe in Old River st. West..	10		
East.....	12 in.	Randall................................	Pipe in Lorain st. north...	48		
	12 in.	Randall................................	Between 30 and 12 inch pipe 18 feet N. of Lorain st................................	17	3,184	
	10 in.	Carter..................................	At Girard st. connecting 16 inch pipe with 6 and 8 inch pipe..................	15		6 to 10 in, I, Relaid.
North...	10 in.	Euclid..................................	10 inch T at Public Square E. to 10 inch T at Erie st..............................	1,543		
	10 in.	Euclid..................................	Between 10 and 20 inch pipes, 32 feet E. of W. L. Erie st........................	14		6 to 10 in. I. Relaid.
West....	10 in.	Forest..................................	Connecting 16 inch in Forest st. with 6 inch in Woodland ave..................	21		
West....	10 in.	Forest..................................	Connecting 16 inch in Forest st. with 8 in pipe in Orange st.....................	17		
East.....	10 in.	South Water........................	From 20 inch pipe in Superior st. S. to 8 inch pipe in Superior st.............	39	1,649	6 to 10 in. I. Relaid.
East.....	8 in.	Ansel..................................	Pipe in Republic st. south...	731		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
West...	8 in.	Bolton	384 feet N. of Euclid ave. North	1,308		
South...	8 in.	Cedar	Pipe in South Bell ave. to 114 feet W. of Altoona st	2,106		
South...	8 in.	Cedar	Pipe in Doan st. to pipe in Streator ave	843		
	8 in.	Carter	Between 10 and 8 inch pipe at Girard st	23		
East....	8 in.	Carter	S. L. of C. C. C. & I. R. R. to 8 inch T at Girard st	1,030		
South .	8 in.	Carter st	S. L. of C. C. C. & I. R. R. to pipe in Scranton ave	1,115		
East....	8 in.	Columbus	Valve 72 feet S. of Lorain st. to S. L. Willey st	1,120		10 to 8 in. C. Relaid.
West..	8 in.	Doan	Pipe in Cedar ave north	28		
East..	8 in.	Dunham	12 feet N. of S. L. Lexington ave. to 4 feet N. of Hough ave	884		
East....	8 in	Dunham	4 feet N. of Hough ave. to cross in Hough ave	40		6 to 8 in. I. Relaid.
South..	8 in.	Eagle	Pipe in woodland ave. to pipe in Sheriff st	22		4 to 8 in. I. Relaid.
West....	8 in.	Forest	Connecting 16 inch pipe in Forest st. with 6 inch pipe in Croton st	16		
North. .	8 in.	Huron	Pipe in Sheriff st. to pipe in Ontario st	416		4 to 8 in. I. Relaid.
West.	8 in.	Ontario	56 feet S. of Howe st. south	185		8 to 8 in. I. Relaid.
West.	8 in.	Ontario	172 feet N. of Bolivar st. to 6 feet N. of S. L. Bolivar st	232		6 to 8 in. I. Relaid.
South	8 in.	Superior	10 inch pipe in South Water st. to 6 inch pipe in Public Square	1,298		
East..	8 in.	Scranton	16 inch pipe Girard st. to 166 feet N. of Carter st	1,445		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
West....	8 in.	Taylor..............................	8 inch pipe Detroit st. south..............................	35		
	8 in.	Taylor..............................	Between 30 and 8 inch pipe 8 feet S. of Detroit st..............................	15		
West....	8 in.	Wood..............................	S. L. St. Clair st. north..............................	60		4 to 8 in. I. Relaid.
West....	8 in.	Wood..............................	N. L. Rockwell st. south..............................	69		
East.....	8 in.	Water	Pipe in Lake st. to N. L. St. Clair st..............................	666	13,787	6 to 8 in. I. Relaid.
South...	6 in.	Auburn..............................	E. L. Merchant ave. east..............................	250		•
South...	6 in.	Auburn..............................	Pipe in Pearl st. to pipe in Scranton ave..............................	1,058		
West....	6 in.	Broadway..............................	Pipe in Ohio st. to pipe in Woodland ave..............................	556		4 to 8 in. I. Relaid.
West....	[illegible] in.	Brookfield..............................	N. L. Euclid ave. north..............................	19		
East.....	[illegible] in.	Birch..............................	Pipe in Ravine st. north..............................	373		
North...	[illegible] in.	Beaver..............................	Pipe in Wilcutt st. to pipe in Chester st..............................	386		
East.....	[illegible] in.	Brunswick..............................	126 feet S. of Ray st. to 226 feet N. of Standard st..............................	692		
West....	6 in.	Brownell..............................	Pipe in Prospect st. to N. L. Prospect st..............................	52		3 to 6 in. I. Relaid.
South...	6 in.	Bolivar..............................	Pipe in Prospect st. to S. L. Prospect st..............................	34		4 to 6 in. I. Relaid.
West....	6 in.	Bertram..............................	Pipe in Cedar ave. to S. L. Cedar ave..............................	25		
North...	6 in.	Bradford..............................	Pipe in Brock st. east..............................	224		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points	Ft. Laid	Total.	Remarks.
South...	6 in.	Buhrer	Pipe in Scranton ave. to pipe in Jennings ave	1,724		
South...	6 in.	Barber	E. L. Hitchcock st. west	322		
East....	6 in.	Buell	Pipe in St. Clair st. to 5 feet N. of St. Clair st	61		4 to 6 in. I. Relaid.
North..	6 in.	Crawford	Pipe in Genesee ave. to 7 feet E of W. L. Tilden ave	855		
East....	6 in.	Case	Pipe in Croton st. S. to pipe in Croton allley	24		
East....	6 in.	Chester	N. L. Beaver st. to pipe in Beaver st	19		
West....	6 in.	Cologne	Pipe in Auburn st, north	77		
East....	6 in.	Chesire	Pipe in Prospect st. to S. L. Prospect st	39		4 to 6 in. I. Relaid.
West....	6 in.	Canfield	Pipe in Lake st. to pipe in Davenport st	252		4 to 6 in. C. Relaid.
West....	6 in.	Canfield	Pipe in St. Clair st. to N. L. St. Clair st	54		4 to 6 in. I. Relaid.
North...	6 in.	Cobleigh	Pipe in Willson ave. to 5 feet E. of Willson ave	30		
	6 in.	Carter	Between 8 inch and 6 inch pipes at hydrant, at Hildebrand st	14		
South...	6 in.	Champa	S. L. Broadway to E. L. Colorado st	504		
North...	6 in.	Creighton	Pipe in Perry st. to E. L. Perry st	24		4 to 6 in. I. Relaid.
South...	6 in.	Davenport	Pipe Canfield st to Valve on E. L. Clinton Park	1,270		4 to 6 in. C. Relaid.
East....	6 in	Delaware	Pipe in St. Clair st. to S. L. St. Clair st	43		4 to 6 in. I.
West....	6 in.	Dodge	Pipe in Euclid ave. north	414		4 to 6 in. C. and I. Relaid.

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
South...	6 in.	Eagle..................................	Pipe in Sheriff st. to pipe in Erie st..................................	1,017		4 to 6 in. I. Relaid.
East.....	6 in.	East Madison..........................	9 feet S. of Euclid ave. to N. L. E. Prospect st..........................	758		
East.....	6 in.	East Madison..........................	26 feet N. of Lena st. north.......	762		
East.....	6 in.	Forest..................................	9 feet S. of N. L. Trumbull st. north..................................	15		
	6 in.	Forest..................................	Between 12 and 6 inch pipe 4 feet N. of Trumbull st....................	14		
West....	6 in.	Fall........	75 feet N. of German st. to Leonard st....................	170		
West....	6 in.	Fall........................	75 feet N. of German st. to pipe in German st..........................	95		4 to 6 in. I. Relaid.
South...	6 in.	Freeman..............................	Pipe in Columbus st. to 162 feet W. of Columbus st..........................	207		4 to 6 in. C. Relaid.
North...	6 in.	Frankfort..............................	E. L. Bank st. to W. L. Bank st..................................	99		4 to 6 in. I. Relaid.
West....	6 in.	Granger..............................	Pipe in Prospect st. to S. L. Prospect st..................................	34		4 to 6 in. I. Relaid.
South...	6 in.	Huron..................................	Pipe in Euclid ave. west to E. L. of alley..........	690		4 to 6 in. C. and I. Relaid.
North...	6 in.	Huron..................................	Pipe in Prospect st. to E. L. of alley..................................	449		4 to 6 in. C. and I. Relaid.
South...	6 in.	Haltworth..............................	Pipe in Willson ave. to E. L. Willson ave..................................	56		
East.....	6 in.	Huntington.....	N. L. Garden st. to N. L. Prospect st..........................	917		4 to 6 in. I. Relaid.
South...	6 in.	Holmden.................	Pipe in Pearl st. to pipe in Scranton ave..................................	638		
South...	6 in.	Holmden..............................	Cross at Grove Lane east..................................	321		
East.. ..	6 in.	Hunter..................................	893 feet N. of Broadway north..................................	26		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
North...	6 in.	High..............................	Pipe in Ontario st. to 8 feet W. of E. L. Sheriff st. from the north	504		4 to 6 in. C and I. Relaid.
West...	6 in.	Irving..............................	Pipe in Broadway Extension south..............	165		
West....	6 in	Irving..	Pipe in Broadway N. to N. Y. C. & St. Louis R R..................................	964		
East....	6 in.	Isabella..............................	Pipe in Clark ave. south..	1,909		
East....	6 in.	Iona....	Pipe in Clark ave. south.	2,095		
North...	6 in	Jefferson	Pipe in Central Way east to 185 feet west of Cuyahoga river........	1,291		
North...	6 in.	Julia	Pipe in Willson ave. to pipe in Seelye ave..................................	455		
East.....	6 in.	Japan.....	Pipe in Siam st. to pipe in China st.............	443		
North...	6 in.	Johnson	Pipe in Water st. to 4 inch pipe in Bank st.......	509		4 to 6 in. I. Relaid.
West....	6 in.	Joseph.........	Pipe in Walton ave. south.....	257		
East...	6 in.	Kentucky..	Pipe in Terret st, to pipe in Reservoir st...........	309		
West....	6 in.	Kingsbury Run Viaduct.......	47 feet S. of N. abutment near Perun st. south.....	240		
North...	6 in.	Long	20 feet E. of W. L. Seneca st. W. to connect with 6 inch pipe................	790		4 to 6 in. I. Relaid.
South..	6 in.	Lawn	Pipe in Gorden ave. to 511 W. of Chestnut Ridge.........	1,635		
East...	6 in.	Lisbon.	192 feet S. of South Woodland ave. south..............	104		
West....	6 in.	Lincoln............	8 feet S. of Euclid ave. to N. L. East Prospect st....	757		
South...	6 in.	Meyer ave.........	Pipe in Pearl st. west........	39		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
West....	6 in.	Mill	Pipe in Monroe to 50 feet N. of C. C. C. & I. R. R	656		
East.....	6 in.	Mill	Pipe in Barber ave to 50 feet N. of C. C. C. & I. R. R	1,207		
North...	6 in.	Margaret	Pipe in Kirtland st. to 19 feet W. of Willson ave	988		
North...	6 in.	Mandrake	Pipe in Water st. to W. L. Water st	61		4 to 4 in. C. Relaid.
North...	6 in.	Myrtle ct	Pipe in Sawtell ave west	760		
West....	6 in.	Millford	Pipe in Clark ave. to 4 feet N. of Storer ave	2,599		
West....	6 in.	Noyes	N. L. Castle ave. to 44 feet S. of Castle ave	111		
East.....	6 in.	Olivar	Pipe in St. Clair st. to 6 feet S. of St. Clair st	49		4 to 6 in. I. Relaid.
South...	6 in.	Pine	Pipe in Greenwood st. to pipe in Sterling ave	504		
South...	6 in.	Perkins	Pipe in Willson ave. to 26 inch W. of Willson ave	71		
North...	6 in.	Perkins	Pipe in Sterling ave to 141 feet E. of Siegel st	506		
West....	6 in.	Pelton	Pipe in Willey st. to Cliff st	1,778		
East.,...	6 in.	Portage	Pipe in Broadway to Cross in Adolpha st	1,491		
East.....	6 in.	Perun	Kingsbury Run Viaduct to E. L. Viaduct	37		
East.....	6 in.	Ross	Pipe in St. Clair st. to N. L. St. Clair st	53		4 to 6 in. 1. Relaid.
North..	6 in.	Ravine	E. L. Birch st. west	194		
,..	6 in.	Reservoir	Pipe in Kentucky st. west	563		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
North..	6 in.	Rockwell	Pipe in Wood st. to 4 feet E. of Wood st	60		4 to 6 in. I. Relaid.
West....	6 in.	Streator	Pipe in Cedar ave. to S. L. Cedar ave	23		
East....	6 in.	Sheriff	Pipe in Euclid ave. to N. L. Prospect st	516		4 to 6 in. I. Relaid.
East....	6 in.	Sheriff	S. L. Bolivar st. south	310		4 to 6 in. C. Relaid.
East....	6 in.	Sheriff	Pipe in Eagle st. north to connect	150		
West....	6 in.	Swan	Pipe in Literary st. north	349		
East.....	6 in.	Smith ave.	N. L. Broadway north	19		
West....	6 in.	South Bell ave.	Pipe in Cedar ave. south	698		
East.....	6 in.	Sanford	Pipe in Woodland ave. south	464		
North..	6 in.	Vincent	Pipe in Bond st. to E. L. Bond st	30		
West....	6 in	Tremont	Pipe in Starkweather ave. to S. L. Jefferson st	506		
South...	6 in.	Vermont	W. L. Pearl st. to pipe in Hanover st	567		
South...	6 in.	Vermont	W. L. Pearl st. to pipe in Pearl st	34		4 to 6 in. I. Relaid.
West....	6 in	Vienna	Pipe in Cedar ave. to S. L. Cedar ave	23		
N'th..	6 in.	Wilber	7 feet E. of Streator ave. to pipe in Doan st	827		
East....	6 in.	Wilcutt	Pipe in Beaver st. to N. L. of Beaver st	19		
South..	6 in.	Walton	11 feet E. of W. L. Joseph st. west	125		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points	Ft. Laid	Total.	Remarks.
South...	6 in.	Wade ave....	Pipe in Rhodes ave west....	466		
		For Hydrants....	....	432	45,296	
North...	4 in.	Croton alley....	Pipe in Case ave. east to angle....	155		
West....	4 in.	Croton alley....	Pipe at angle south....	225		
	4 in.	Fountain....	Fairmount Reservoir S. basin....	365		
	4 in.	Fountain....	Fairmount Reservoir N. basin....	535		
South...	4 in.	High....	137 feet E. of Sheriff st. east....	42		4 to 4 in. C. Relaid.
North...	4 in.	High....	T in Sheriff st. east....	158		4 to 4 in. C. Relaid.
East....	4 in.	Hickox alley....	Pipe in Euclid ave. to S. L. Euclid ave....	65		3 to 4 in. I. Relaid.
South...	4 in.	Judd....	Pipe in Perry st. to W. L. Perry st....	33		
	4 in.	York st. extension....	At Mill st. connecting 4 inch and 6 inch pipe....	12		
	4 in.	For Hydrants....	....	2,640	4,230	
East....	3 in.	Hubbel ct....	Pipe in Detroit st. to N. L. Detroit st....	39		
East....	3 in.	Hubbel ct....	N. L. Detroit st. north....	280		Wrought iron.
East....	3 in.	North Place....	Pipe in Garden st. north....	246		

LOW SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885.—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
West....	3 in.	Wheller Place........................	150 feet S. of Eagle st. south..	139		
		For Hydrants............................	....	6	710	

LOW SERVICE DISTRICT.

SCHEDULE of Pipe Taken Up and Relaid in 1885.

Size of Pipe Taken Out.	Size of Pipe Relaid.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
4 inch........	6 in........	Broadway................	Pipe in Ohio st. to pipe in Woodland ave..	556		Iron.
3 inch........	6 in........	Brownell..................	Pipe in Prospect st. to N. L. Prospect st..	52		Iron.
4 inch........	6 in........	Bolivar....................	Pipe in Prospect st. to S. L. Prospect st..	34		Iron.
4 inch........	6 in........	Buell........................	Pipe in St. Clair st. to 5 feet N. of St. Clair st..	61		Iron.
4 inch..	6 in........	Cheshire..................	Pipe in Prospect st. to S. L. Prospect st..	39		Iron.
4 inch........	6 in........	Canfield..................	Pipe in Lake st. to pipe in Davenport st..	252		Cement.
4 inch........	6 in........	Canfield..................	Pipe in St. Clair st. to N. L. St. Clair st..	54		Iron.
4 inch........	6 in........	Creighton................	Pipe in Perry to E. L. Perry st..	24		Iron.
6 inch........	10 in........	Carter.................	At Girard st. connect 16 inch pipe with 8 and 6 inch pipe..	15		Iron.
8 inch........	8 in........	Columbus..................	Valve 72 feet S. of Lorain st. to S. L. Willey st..	1,120		Cement.
6 inch........	8 in........	Dunham..................	4 feet N. of Hough ave. to cross in Hough ave..	40		Iron.
4 inch	6 in........	Davenport................	Pipe in Canfield st. to valve on E. L. Clinton Park..	1,270		Cement.
4 inch........	6 in........	Delaware..................	Pipe in St. Clair st. to S. L. St. Clair st..	43		Iron.
4 inch........	6 in........	Dodge.....................	Pipe in Euclid ave. north..	414		Cem. and Iron.
4 inch........	6 in........	Eagle......................	Pipe in Sheriff st. to pipe in Erie..	1,017		Iron.

LOW SERVICE DISTRICT.

SCHEDULE of Pipe Taken Up and Relaid in 1885—Continued.

Size of Pipe Taken Out.	Size of Pipe Relaid.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
4 inch	8 in	Eagle	Pipe in Sheriff st. to pipe in Woodland ave	22		Iron.
6 inch	10 in	Euclid	Between 10 and 20 inch pipes, 32 feet E. of W. L. Erie st	14		Iron.
16 inch	16 in	Franklin	75 feet W. of Pearl st. W. to 16 inch Valve at Circle	582		Cement.
4 inch	6 in	Fall	75 feet north of German st. to pipe in German st	95		Iron.
4 inch	6 in	Freeman	Pipe in Columbus st. to 162 feet W. of Columbus st	207		Cement.
4 inch	6 in	Frankfort	E. L. of Bank st. to W. L Bank st	99		Iron.
4 inch	6 in	Granger	Pipe in Prospect st. to S. L. Prospect st	34		Iron.
4 inch	6 in	Huron	Pipe in Euclid ave. W. to E. L. of alley	680		Cem. and Iron.
4 inch	6 in	Huron	Pipe in Prospect st. W. to E. L. of alley	449		Cem. and Iron.
4 inch	8 in	Huron	Pipe in Sheriff st. to pipe in Ontario st	416		Iron.
4 inch	6 in	Huntington	N. L. Garden st. to N. L. Prospect st	917		Iron.
4 inch	6 in	High	Pipe in Ontario st. to 8 feet W. of E. L. Sheriff st. from the north	564		Cem. and Iron.
4 inch	4 in	High	137 feet East of Sheriff st. East	42		Cement.
4 inch	4 in	High	T in Sheriff st. east	158		Cement.
3 inch	4 in	Hickox alley	Pipe in Euclid ave. to S. L. Euclid ave	65		Iron.
4 inch	6 in	Johnson	Pipe in Water st. to 4 inch pipe in Bank st	569		Iron.

LOW SERVICE DISTRICT.

SCHEDULE of Pipe Taken Up and Relaid in 1885—Continued.

Size of Pipe Taken Out.	Size of Pipe Relaid.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
4 inch	6 in.	Mandrake	Pipe in Water st. to W. L. Water st.	61		Iron.
4 inch	6 in.	Oliver	Pipe in St. Clair st. to 6 feet S. of St. Clair st	49		Iron.
8 inch	8 in.	Ontario	56 feet S. of Howe st. south	185		Iron.
8 inch	8 in.	Ontario	172 feet N. of Bolivar st. to 6 feet N. of S. L. Bolivar st	232		Iron.
4 inch	6 in.	Ross	Pipe in St. Clair st. to N. L. St. Clair st	53		Iron.
4 inch	6 in.	Rockwell	Pipe in Wood st. to 4 feet E. of Wood st	60		Iron.
4 inch	6 in.	Sheriff	Pipe in Euclid ave. to N. L. Prospect st.	516		Iron.
4 inch	6 in.	Sheriff	S. L. Bolivar st. south	310		Cement.
6 inch	10 in.	South Water	20 inch pipe in Superior st. south to 8 inch pipe in Superior st	39		Iron.
4 inch	6 in.	Vermont	W. L. Pearl st. to pipe in Pearl st	34		Iron.
4 inch	6 in.	Long	20 feet E. of W. L. Seneca st west to connect with 6 inch pipe	790		Iron.
6 inch	8 in.	Water	Pipe in Lake st. to N. L. St. Clair st	966		Iron.
4 inch	8 in.	Wood	S. L. St. Clair st. north	60		Iron.
4 inch	4 & 6 in.	Hydrants		48		
3 inch	4 & 6 in.	Hydrants		420	13,427	
			13,427 feet or 2 miles, 2867 feet of pipe relaid and lowered.			

PIPE ABANDONED IN 1885.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
West....	4 in.	Bank..................................	4 inch pipe in St. Clair st. to 4 inch pipe in Superior st..............................	716		
North...	6 in.	Euclid..............................	Pipe at Public square to pipe in Erie st..	1,500		
North...	4 in.	Superior	Pipe in Water st. to pipe in Public square...	1,375		
East.....	6 in.	Taylor................................	Pipe in Detroit st. south..	27		
East. . .	6 in.	Randall..............................	Pipe in Lorain st. north..	25		
	3 in.	Superior.............................	Hydrant connection..	40	3,683	

LOW SERVICE DISTRICT.

Total Feet of Pipe Laid to December 31st., 1885.

Diameter of Pipe in inches	36 in.	30 in.	24 in.	20 in.	16 in.	12 in.	10 in.	8 in.	6 in.	4 in.	3 in.
Both Districts—Laid previous to 1885	14,162	52,679	14,944	13,767	14,090	8,798	69,483	178,049	515,786	139,452	14,656
Laid in High Service District in 1883–84	....	16,232	2,814	2,672	1,462	111	....	....	....	....	....
Pipe in Low S. District previous to 1885	14,162	36,447	12,130	11,095	12,628	8,687	69,483	178,049	515,786	139,452	14,656
Laid in Low Service District in 1885	36	5,590	34	....	2,729	3,184	1,649	13,787	45,296	4,230	710
Total	14,198	42,037	12,164	11,095	15,357	11,871	71,132	191,836	561,082	143,682	15,366
Taken out and abandoned in 1885	....	....	....	....	582	....	....	1,537	2,326	12,088	577
Totals in Use	14,198	42,037	12,164	11,095	14,775	11,871	71,132	190,299	558,756	131,594	14,789
	94,269					978,441					

RECAPITULATION.

94,269	feet of supply main	equal to	17 miles	4,509 feet.
978,441	feet of distributing main	equal to	185 miles	1,641 feet.
1,072,710	feet of main	equal to	203 miles	870 feet.
7,807	feet of increased supply main in 1885	equal to	1 mile	2,527 feet.
52,328	feet of increased distributing main in 1885	equal to	9 miles	4,808 feet.
60,135	feet of increased main in 1885	equal to	11 miles	2,055 feet.

LOW SERVICE DISTRICT.

SCHEDULE showing Streets in which Pipes were Lowered in 1885.

Side.	Size.	Street.	Between what Points.	Feet.	Total.	Remarks.
East & West	6 in.	Alabama	N. L. St. Clair st. to S. L. St. Clair st	98		
East	6 in.	Armitage	From angle south	400		
East	8 in.	Bank	8 inch pipe in Superior st. to S. L. St. Clair st	661		
West	6 in.	Brownell	Pipe in Prospect to S. L. Prospect st	40		
North	6 in.	Cedar ave	Pipe in Perry st. 48 feet E. of Perry st	77		
East	6 in.	Cross	N. L. Orange st. north	360		
West	6 in.	Dodge	Pipe in Superior st. south	648		
West	6 in.	Dodge	N. L. to S. L. St. Clair st	100		
South	6 in.	Diamond Park	Pipe in Willson ave. to E. L. Willson ave	34		
North	6 in.	Ensign	Pipe in Willson ave. to E. L. Willson ave	34		
East	4 in.	Hanover	N. L. Detroit st. north	440		
South	4 in.	Hazen	Pipe in Perry st. to E. L. Perry st	26		
East	6 in.	Kennard	S. L. Euclid ave. to S. L. Prospect st	483		
North	6 in.	Lorain	At Tracy st	121		
East	8 in.	Literary	N. Y. P. & O. R. R. to McKinstry st	770		
South	8 in.	McBride	Pipe in Willson ave. west	400		
East	6 in.	Muirson	N. L. St. Clair st, to Superior st	770		

LOW SERVICE DISTRICT.

SCHEDULE showing Streets in which Pipes were Lowered in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Feet.	Total.	Remarks.
East....	6 in.	Minnesota..........................	Pipe in St. Clair st. to S. L. St. Clair st..........	43		
North...	6 in.	Marion..	Pipe in Perry st. to E. L. Perry st......	26		
East....	6 in.	North Perry................	Pipe in St. Clair to S. L. St. Clair..	41		
West....	8 in.	Ontario............................	31 feet N. of S. L. Public square, to 56 feet S. of Howe st.......................	777		
West....	8 in.	Ontario.	158 feet N. of Huron st. to 172 feet N. of Bolivar st......................	529		
West. ..	8 in.	Ontario............................	Pipe in Rockwell st. N. to St. Clair st..	424		
South...	8 in.	Orange.............................	E. L Cross st. to W. L. Perry st................	1,690		
South...	8 in.	Orange.............................	E. L. Perry st. to W. L. Irving st..........................	930		
South...	10 & 8 in	Prospect...........................	E. L. Case ave. to W. L. Willson ave......	1,532		
South...	10 in.	Prospect...........................	E. L. Erie to W. L. Perry st..	3,064		
West....	6 in.	Perry...............................	S. L. Prospect st. to N. L. Garden st..	1,111		
East....	6 in.	Perry...............................	S. L. Garden st. to 34 feet S. of N. L. Woodland ave...........................	1,607		
South...	8 in.	St. Clair st.....	E. L. Erie st. to W. L. Sterling ave........	5,818		
North...	6 in.	Sibley..............................	Pipe in Perry st. to 14 feet E. of Perry st.....................................	48		
West....	4 in.	Tracy...............................	Lorain st. north..	352		
South...	6 in.	Vega................................	21 feet E. of W. L. Pearl st to 230 E. of Rhodes ave..............................	2,080		
South...	6 in.	Webster............................	Brownell st. to Erie st.....	1,150		

LOW SERVICE DISTRICT.

SCHEDULE showing Streets in which Pipes were Lowered in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Feet.	Total.	Remarks.
East.....	8 in.	Willson	Kinsman st. to hydrant at S. L. Julia st	1,896		
East.....	8 in.	Willson	At McBride st	200		
West....	6 in.	Winter	Leonard st. to Columbus st	360		
South...	8 in.	Woodland ave	Pipe in Eagle st. north	120		
			29218 feet equal to 5 miles, 2818 feet of pipe lowered.		29,218	

HIGH SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
West....	30 in.	Woodland Hills ave....	Valve at S. L. Norman st. connect with stand pipe....................................	76		
					76	
	20 in.	Kinsman st. Reservoir.........	Waste pipe from foot of slope, east	47		
		Kinsman st. Reservoir.........	Overflow pipe at top of embankment.....	26		
		Kinsman st. Reservoir.........	Overflow pipe from Y in waste pipe west to foot of slope............................	35		
North...	20 in.	Union....	30 inch pipe in Woodland Hills ave. to end of T at Axtell st.........................	3,265		
North...	20 in.	Way......................................	18 feet W. of 30 inch pipe in W. Hills ave. west..	25		
					3,398	
North...	16 in.	Harvard....	24 inch pipe in Woodland Hills ave. west..	1,760		
North...	16 in.	Kinsman................................	24 feet W. of Woodland Hills ave. to 13 feet W. of Broadway..................	50		
North...	16 in.	Miles..........	17 feet W. of 30 inch in Woodland Hills ave. west................................	58		
North...	16 in.	So. Woodland......	16 to 10 inch cross in Woodland Hills ave. west....................................	48		
					1,910	
North...	12 in.	Aetna.......	E. L. Axtell st. from the north west..	27		
West....	12 in.	Axtell..	20 inch pipe in Union st. to 12 inch in Marble st............................	2,962		
East.....	12 in.	Broadway	S. L. Cataract st. to pipe in Miles st..	642		
West....	12 in.	Broadway..	12 feet N. of S. L. Marble st. to S. L. Cataract st....................................	4,395		

HIGH SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
South...	12 in.	Fairmount.	Pipe in Woodland Hills ave. to 121 W. of Woodland Hills ave.	69		
	12 in.	Harvard	Between 16 inch and 12 inch pipe at Broadway	18		
South...	12 in.	Harvard	8 inch pipe 23 feet W. of E. L. Broadway to 18 feet W. of Broadway	77		
South...	12 in.	Marble	Pipe in Broadway to pipe in Axtell st	973		
South...	12 in.	Union	28 feet E. of Upton st. west	35		
	12 in.	Union	20 and 12 inch pipe in Union to 16 feet E. of Upton	17		
South .	12 in.	Union	12 foot E. of Axtell st. to 12 foot W. of Axtell st	64		
West....	12 in.	Woodland Hills ave	Pipe in Fairmount st. to 18 feet north of Quincy st. from the East	1,767		
					11,048	
East.....	10 in.	Atlantic	Pipe in Bessemer ave. north	335		
South...	10 in.	Aetna	E. L. Axtell st. from the north east	12		
South...	10 in.	Bessemer ave	Pipe in Upton st. to pipe in Atlantic	1,184		
South...	10 in.	Union	10 inch pipe in Woodland Hills ave. west	45		
East.....	10 in.	Upton	12 inch pipe in Union st. to pipe in Bessemer ave	1,260		
West....	10 in.	Woodland Hills ave	10 inch to 8 inch cross in Miles st. north	56		
West....	10 in.	Woodland Hills ave	12 feet S. of Harvard st. to 10 feet N. of Harvard st	82		
West....	10 in.	Woodland Hills ave	20 to 10 inch cross in Way st. north	19		

HIGH SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft. Laid	Total.	Remarks.
West...	10 in.	Woodland Hills ave...	12 foot S. of Union st. north...	74		
West...	10 in.	Woodland Hills ave...	16 to 10 inch cross in Kinsman st. north...	31		
West...	10 in.	Woodland Hills ave...	16 to 10 inch cross in S. Woodland ave. north...	35		
South...	10 in.	Warner Road...	Pipe in Broadway to 9 feet W. Broadway...	56		
					3,194	
West...	8 in.	Axtell...	12 inch pipe in Union st. north...	48		
East...	8 in.	Broadway...	Pipe in Miles st. to 8 ft. S. of Miles st...	32		
South...	8 in.	Harvard...	10 in. pipe in W. Hills ave. to 23 feet W. of E. L. Broadway...	1,724		
North...	8 in.	Marble...	Pipe in Axtell st., east...	32		
South...	8 in.	Miles...	Pipe in Broadway, to 10 in. Pipe in W. Hills ave...	628		
					2,474	
West...	6 in.	Axtell...	Pipe in Marble st., south...	37		
North...	6 in.	Axtell...	Pipe in Broadway, to E. L. Broadway...	43		
South...	6 in.	Brunner...	Pipe in Broadway, to E. L. Broadway...	44		
South...	6 in.	Canton...	Pipe in Broadway, to W. L. Broadway...	23		
West...	6 in.	Elmo...	Pipe in Harvard, to N. L. Harvard...	38		
South...	6 in.	Fairmount...	Pipe in Woodland Hills ave., east...	288		

HIGH SERVICE DISTRICT.

SCHEDULE showing the Extension of Water Pipe in 1885—Continued.

Side.	Size.	Street.	Between what Points.	Ft.Laid	Total.	Remarks.
South...	6 in.	Hinman	Pipe in Broadway, to W. L. Broadway	24		
South...	6 in.	Hughes	Pipe in Broadway, to W. L. Broadway	21		
South...	6 in.	Jones	E. L. in Broadway, to W. L. Broadway	71		
South...	6 in.	Miles Park	Pipe in Broadway, to E. L. Broadway	18		
South...	6 in.	Seager	Pipe in Broadway, to E. L. Broadway	45		
West....	6 in.	Sawyer	N. L. to S. L. Harvard st	60		
South...	6 in.	Wire	Pipe in Broadway, to E. L. Broadway	47		
South...	6 in.	Worley	Pipe in Broadway, to W. L. Broadway	24		
North...	6 in.	Whitehead	Pipe in Broadway, to east.	88		
West...	6 in.	Whitehead	Pipe in Harvard st., to S. L. Harvard st	26		
West....	6 in.	Wales	Pipe in Harvard st., to N. L. Harvard st	37		
South...	6 in.	Walker	Pipe in Broadway, to W. L. Sawyer st	701		
	6 in.	For Hydrants		156		
					1,771	
South...	4 in.	Leslie Court	Pipe in Broadway, west	370		
	4 in.	For Hydrants		600		
					970	

HIGH SERVICE DISTRICT.

Total Feet of Pipe laid to December 31, 1885.

Diameter of Pipe in Inches	36	30	24	20	16	12	10	8	6	4	3
Laid in 1883 and 1884	....	16,232	2,814	2,672	1,462	111	....	....	....	....	....
Laid in 1885	....	76	....	3,398	1,916	11,048	3,194	2,474	1,771	970	....
Total in use	....	16,308	2,814	6,070	3,378	11,159	3,194	2,474	1,771	970	....
	28,570					19,568					

RECAPITULATION.

	28,570	feet of supply main, equal to	5 miles,	2,170 feet
	19,568	feet of distributing main, equal to	3 miles,	3,720 feet
	48,138	feet of main, equal to	9 miles,	618 feet
	5,390	feet of increased supply main, equal to	1 mile,	110 feet
	19,457	feet of increased distributing main, equal to	3 miles,	3,617 feet
Total,	24,847	feet of increased main, equal to	4 miles,	3,727 feet

MILEAGE OF PIPE IN LOW AND HIGH SERVICE DISTRICTS.

203 miles, 870 feet	in low service district
9 miles, 618 feet	in high service district
212 miles, 1,488 feet	in both districts
11 miles, 2,065 feet	increase in low service district in 1885
4 miles, 3,727 feet	increase in high service district in 1885
16 miles, 502 feet	increase in both districts in 1885
2 miles, 2,867 feet	pipe relaid and lowered
5 miles, 2,818 feet	pipe lowered
Total, 8 miles, 405 feet	pipe relaid and lowered

LOW SERVICE DISTRICT.

SCHEDULE showing the Location of Fire Hydrants set in 1885.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
C 1	3 to 4	East	Alabama		At St. Clair st	
1	4	East	Ansel ave	68	South of Lamont st	
1	4	North	Auburn		At Little st	
1	4	North	Auburn	64	West of Berlin st	
1	4	North	Auburn		At Pearl st	
1	4	South	Auburn	250	East of Merchant ave	
1	4	South	Broadway	180	West of Ohio st	
1	4	East	Belden ave		At Superior st	
1	4	West	Bolton ave	737	North of Euclid ave	
1	4	West	Bolton ave	1,091	North of Euclid ave	
1	4	West	Bolton ave	1,393	North of Euclid ave	
1	4	West	Bolton ave	1,690	North of Euclid ave	
1	4	East	Birch	118	North of Ravine st	
1	4	East	Brunswick	62	South of Standard st	
1	4	East	Brunswick	226	North of Standard st	
1	4	South	Buhrer ave	258	East of Scranton ave	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	South...	Buhrer ave........................	199	West of Lane st...	
1	4	South...	Buhrer ave........................	72	East of Lane st...	
1	4	South...	Buhrer ave........................	487	West of Jennings ave...	
1	4	South...	Buhrer ave........................	204	West of Jennings ave..........................	
1	4	West....	Bank st...........................	131	North of Frankfort st...	
1	4	North...	Bradford st.......................	200	East of Brook st..	
1	4	South...	Barber ave........................	262	West of Hitchcock st......	
1	4	East.....	Buell st..........................		At St. Clair st..	
1	4	South...	Carter st.....................	109	West of Scranton ave...	
1	6	South...	Carter st.........................	415	West of Scranton ave...	
1	6	South...	Carter st.........................		At Hildebrand st..........................	
1	6	East.....	Carter st.........................	40	South of C. C. C. & I. R. R..	
1	6	East.....	Carter st.........................	150	North of Collins st.........	
1	6	East.....	Carter st.........................	107	South of Collins st...	
1	6	East.....	Carter st.........................	429	South of Collins st., at Girard st..	
1	4	East.....	Croton alley......................	220	South of Angle, in alley.	
1						

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	South...	Cedar ave...........................		At Bertram st..	
1	4	South...	Cedar ave...........................		At Lincoln ave..	
1	4	South...	Cedar ave...........................	114	West of Altoona st..	
1	4	South...	Cedar ave...........................	392	East of Bertram st..	
1	4	South...	Cedar ave...........................		At Vienna st..	
1	4	South...	Cedar ave...........................	62	West of South Bell ave..	
1	4	South...	Cedar ave...........................	147	East of Streator ave..	
1	4	South ..	Cedar ave...........................	21	West of Halsey st..	
1	4	East......	Columbus ave...........................	98	South of Lorain st..	
1	4	West....	Columbus ave...........................	34	South of Abbey st..	
C 1	3 to 4	East......	Columbus ave...........................	10	South of Freeman st..	
1	4	East......	Columbus ave...........................	213	South of Freeman st..	
1	4	North...	Crawford road...........................	63	East of Genesee ave..	
1	4	North...	Crawford road...........................	350	East of Genesee ave..	
1	4	North...	Crawford road...........................	235	West of Tilden ave..	
1	4	North...	Crawford road...........................		At Tilden ave..	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	West	Cologne st.	61	North of Auburn st.	
1	4	South	Champa st.		At Colorado st.	
1	4	South	Champa st.	208	East of Colorado st.	
1	4	East	Davies st.	17	North of Broadway	
1	4	South	Davenport st.		At Canfield st.	
C 1	3 to 4	South	Davenport st.	334	East of Canfield st.	
1	4	South	Davenport st.	211	West of Clinton park	
1	4	South	Davenport st.	118	East of W. L. Clinton park	
C 1	3 to 4	South	Davenport st.	120	At E. L. Clinton park	
1	4	East	Dunham ave.	162	North of Quimby st.	
1	4	East	Dunham ave.	211	South of Quimby st.	
1	4	West	Dodge st.	8	North of Euclid ave.	
C 1	3 to 4	West	Dodge st.	7	South of Superior st.	
1	4	West	Dodge st.		North of Payne ave.	
C 1	3 to 4	East	Dodge st.		At Walnut st.	
C 1	3 to 4	West	Dodge st.		At St. Clair st.	

LOW SERVICE DISTRICT.

SHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
C 1	4 to 6	North	Division st		At E. L. Water Works property	
1	6	South	Eagle st	126	At Woodland ave	
C 1	4 to 4	South	Eagle st		W. of Wheeler Place, changed from corner of Wheeler Place	
1	4	South	Eagle st	267	West of Erie st	
1	4	East	East Madison ave	182	South of Euclid ave	
1	4	East	East Madison ave	289	North of East Prospect st	
1	4	East	East Madison ave		At East Prospect st	
1	4	East	East Madison ave	211	North of Lena ave	
1	4	East	East Madison ave	98	North of Silver ave	
1	4	East	East Madison ave	389	North of Silver ave, at a st	
1	6	North	Euclid ave	94	East of Public Square	
1	6	South	Euclid ave	65	East of Hickox alley	
C 1	4 to 6	North	Euclid ave		At Sheriff st	
1	3 to 6	South	Euclid ave	232	East of Bond st	
1	6	North	Euclid ave	144	West of Erie st	
1	6	North	Franklin ave	15	East of Taylor st	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	West....	Forest st.	105	South of Croton st.	
1	4	West....	Forest st.	413	South of Croton st.	
1	4	West....	Forest st.	730	South of Croton st.	
1	4	West....	Forest st.	1,053	South of Croton st.	
1	4	West....	Forest st.	679	North of Trumbull st.	
1	4	West....	Forest st.	363	North of Trumbull st.	
1	4	West....	Forest st.	256	South of Trumbull st.	
1	4	West....	Forest st.	195	North of Broadway.	
1	4	West....	Fall st.	13	North of German st.	
1	4	West....	Fall st.		At Leonard st.	
1	4	South...	Freeman st.	155	West of Columbus st.	
C 1	3 to 4	North...	Frankfort st.		At Bank st.	
C 1	3 to 4	East....	Huntington st.		At Herrick court.	
1	4	East....	Huntington st.	231	South of Herrick court.	
C 1	4 to 4	West ..	Huntington st.	201	North of Garden st.	
1	4	East....	Huntington st.		At Garden st.	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	North	Huron st	305	East of Erie st	
1	4	South	Huron st	472	West of Brownell st	
1	4	North	Huron st		At Euclid ave	
1	6	South	Huron st		At Middle st	
1	4	South	Holmden ave	265	West of Scranton ave	
1	4	South	Holmden ave	303	East of Grove lane	
1	4	North	High st	102	East of Ontario st	
C 1	3 to 4	North	High st	70	West of Sheriff st., changed from Middle st	
1	4	South	High st		East of Sheriff st	
1	4	West	Irving st	179	South of Broadway extension	
1	4	West	Irving st	140	South of Broadway extension	
1	4	West	Irving st	348	North of Angle, in Irving st	
1	4	North	Irving st	233	East of Broadway	
1	4	East	Isabella st	179	South of Clark ave	
1	4	East	Isabella st	188	South of Clark ave	
1	4	East	Isabella st	493	South of Clark ave	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	East	Isabella st.	785	South of Clark ave.	
1	4	East	Isabella st.	1,091	South of Clark ave.	
1	4	East	Isabella st.	1,386	South of Clark ave.	
1	4	East	Isabella st.	1,670	South of Clark ave	
1	4	East	Iona st.	1,977	South of Clark ave.	
1	4	East	Iona st.	339	South of Clark ave.	
1	4	East	Iona st.	684	South of Clark ave.	
1	4	East	Iona st.	1,015	South of Clark ave.	
1	4	East	Iona st.	1,360	South of Clark ave.	
1	4	East	Iona st.	1,737	South of Clark ave.	
1	4	North	Jefferson st.	2,076	East of Central Way	
1	4	North	Jefferson st.	199	West of Kansas st.	
1	4	North	Jefferson st.	68	West of Kansas st.	
1	4	North	Jefferson st.	142	At Soothan st.	
1	4	North	Jefferson st.	185	West of Cuyahoga river	
1	4	North	Julia st.	232	West of Willson ave.	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	East	Japan st	232	North of Siam st	
1	4	North	Johnson st	283	East of Water st	
C 1	3 to 4	South	Johnson st	217	At Bank st	
1	4	East	Joseph st		South of Walton ave	
C 1	3 to 4	East	Kennard st	228	At Prospect st	
1	4	East	Kennard st		North of Prospect st	
1	4	South	Lawn st	229	West of Gordon ave	
1	4	South	Lawn st	272	West of Gordon ave	
1	4	South	Lawn st	581	East of Chestnut Ridge st	
1	4	South	Lawn st	319	At Chestnut Ridge st	
1	4	South	Lawn st		West of Chestnut Ridge st	
C 1	3 to 4	South	Lorain st	311	At Tracy st	
1	4	North	Long st		West of Seneca st	
C 1	3 to 4	South	Literary st	733	At Herschell st	
1	4	East	Lisbon st		South of S. Woodland	
1	4	West	Lincoln ave	296	South of Euclid ave	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	West....	Lincoln ave...	286	North of East Prospect st...	
1	4	West....	Lincoln ave...		At East Prospect st...	
1	4	East.....	Mill st...	25	South of C. C. C. & I. R. R...	
1	4	East.....	Mill st...	40	South of Hitchcock st...	
1	4	North...	Margaret st...	295	East of Kirtland st...	
1	4	North...	Margaret st...	332	West of Willson ave...	
1	4	North ..	Marion st...		At Perry st...	
1	4	North...	Myrtle court...	308	West of Sawtell ave...	
1	4	North...	Myrtle court...	721	West of Sawtell ave...	
C 1	3 to 4	West....	Muirson st...		At St. Clair st...	
1	4	West...	Milford st...	236	South of Clark ave...	
1	4	West...	Milford st...	532	South of Clark ave...	
1	4	East. ..	Milford st...	830	South of Clark ave...	
1	4	West...	Milford st...	240	North of Essex st...	
1	4	West...	Milford st...		At Essex st...	
1	4	West...	Milford st...	286	South of Essex st...	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	West....	Milford st...........................	120	North of Miller court..	
1	4	West....	Milford st...........................	68	North of Clark court..	
1	4	West....	Milford st...........................		At Storer ave..	
1	3	East.....	North place...........................	246	North of Garden st..	
1	6	West....	Ontario st...........................		At Michigan st..	
1	6	West....	Ontario st...........................		At Howe st..	
C 1	3 to 6	East.....	Ontario st...........................	158	North of Huron st..	
C 1	3 to 6	East.....	Ontario st...........................	230	South of Huron st..	
1	4	East.....	Ontario st...........................	166	North of Rockwell st..	
1	4	South...	Pine st...........................	191	West of Sterling ave..	
1	4	West....	Pelton ave...........................	11	North of Fremont st..	
1	4	West....	Pelton ave...........................	76	North of Literary st..	
1	4	West....	Pelton ave...........................	247	North of Fairfield st..	
1	4	West....	Pelton ave...........................	273	South of Cliff st..	
1	4	West....	Pelton ave...........................		At Cliff st..	
1	4	South...	Prospect st...........................	350	East of Erie st..	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
C 1	3 to 4	North..	Prospect st.	609	East of Erie st.	
1	4	South...	Prospect st	110	West of Bolivar st.	
1	4	South...	Prospect st.		At Brownell st.	
C 1	3 to 4	North...	Prospect st.	213	West of Huntington st	
1	4	South...	Prospect st.	142	East of Huntington st.	
C 1	3 to 4	North...	Prospect st.		At Cheshire st.	
1	4	South...	Prospect st.	165	East of Cheshire st	
1	4	South...	Prospect st.	154	West of Perry st.	
1	4	South...	Prospect st.	274	East of Kennard st.	
C 1	3 to 4	South...	Prospect st.	300	West of Willson st.	
C 1	3 to 4	South...	Prospect st.	304	East of Case ave.	
1	4	West....	Perry st.	282	South of Prospect st.	
C 1	3 to 4	West. ..	Perry st.	43	South of Sibley st.	
1	4	West....	Perry st.	64	South of Cedar ave.	
C 1	3 to 4	East.....	Perry st.	18	South of Garden st.	
C 1	3 to 4	East.....	Perry st.	8	North of Scovill ave.	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Fire Hydrants set in 1885.—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	East.....	Perry st.............................	50	North of Creighton st..	
C 1	3 to 4	West.....	Perry st.............................	133	North of Hazen st..	
1	4	East.....	Perry st.............................	55	South of Hazen st..	
C 1	3 to 4	East.....	Perry st.............................		At Woodland ave..	
1	4	North...	Perkins st.............................	63	West of Siegel st..	
1	4	North...	Perkins st.............................	141	East of Siegel st..	
1	4	East.....	Portage st.............................	249	North of Broadway..	
1	4	East.....	Portage st.............................	546	North of Broadway..	
1	4	East.....	Portage st.............................	596	South of Adolpha st..	
1	4	East.....	Portage st.............................	297	South of Adolpha st..	
1	4	East.....	Portage st.............................		At Adolphia st..	
1	4	East.....	Ross st.............................		At St. Clair st..	
1	4	North...	Ravine st.............................	133	West of Birch st..	
1	4	North...	Reservoir st.............................	167	West of Kentucky st..	
1	4	North...	Reservoir st.............................	518	West of Kentucky st..	
1	6	East.....	Sheriff st.............................	239	South of Bolivar st..	

LOW SERVICE DISTRICT.

SCHEDULE showing the Location of Fire Hydrants set in 1885—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	East	Sheriff st	189	North of Prospect st	
1	4	West	Swan st	311	North of Literary st	
1	4	West	South Bell ave	282	South of Cedar ave	
1	4	West	South Bell ave	512	South of Cedar ave	
1	4	East	Sanford st	130	South of Woodland ave	
1	4	East	Sanford st	419	South of Woodland ave	
1	6	South	Superior st		At South Water st	
1	6	South	Superior st	125	East of Water st	
1	6	South	Superior st	92	West of Bank st	
1	6	South	Superior st	39	East of Bank st	
1	6	South	Superior st	197	East of Bank st	
1	6	South	Superior st	50	West of Seneca st	
1	6	South	Superior st	122	West of Public Square	
1	4	South	Superior st		At Case ave	
1	6	East	Scranton ave	163	North of Carter st	
1	6	East	Scranton ave	109	South of Carter st	

LOW SERVICE DISTRICT.

SCHEDULE showing the Location of Fire Hydrants set in 1885—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	6	East.....	Scranton ave......................	410	South of Carter st..	
1	6	East......	Scranton ave........................	244	North of Girard st..	
1	4	North...	St. Clair st.....	285	West of Murison st............................	
1	4	South...	St. Clair st......	195	East of Murison st..	
C1	3 to 4	North...	St. Clair st....................... ..		At Canfield st...........	
1	4	South...	St. Clair st.........................	222	East of Canfield st..	
C1	3 to 4	South...	St. Clair st.........................	478	East of Canfield st..	
1	4	North...	St. Clair st.........................	275	West of Dodge st..	
1	4	South...	St. Clair st.........................	211	East of Dodge st	
C1	8 to 4	South...	St. Clair st.........................	298	West of Ross st...............	
C1	3 to 4	North...	St. Clair st.........................		At North Perry st..	
1	4	South...	St. Clair st.........................	264	East of North Perry st...	
C1	3 to 4	South...	St. Clair st.........................	183	West of Buell st..................................	
C1	3 to 4	North...	St. Clair st.........................	67	East of Oliver st..	
1	4	South...	St. Clair st.........................	30	East of Minnesota st....................................	
1	4	North...	St. Clair st.........	32	East of Delaware st..	

LOW SERVICE DISTRICT.

SCHEDULE showing the Location of Fire Hydrants set in 1885—Continued.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	West	Tremont st.	275	North of Starkweather ave.	
1	4	West	Tremont st.		At Jefferson st.	
1	4	South	Vermont st.	15	West of Pearl st.	
1	4	South	Vermont st.	275	West of Pearl st.	
1	4	South	Vermont st.		At Hanover st.	
1	4	South	Vega ave.	14	East of Mill st.	
1	4	South	Vega ave.	192	East of Hitchcock st.	
1	6	West	Water st.		At Lake st.	
C 1	3 to 6	East	Water st.	51	North of Johnson st., changed from the west side of the street	
1	6	West	Water st.	67	South of Mandrake st.	
1	4	South	Wade ave.	437	West of Rhodes st.	
1	4	South	Wilbur st.	152	West of Cutler st.	
1	4	South	Wilbur st.	107	East of Cutler st.	
1	6	West	Willson ave.	60	North of Woodland ave.	
1	4	East	Willson ave.		At Kinsman st.	
1	4	East	Willson ave.	257	South of Kinsman st.	

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Hydrants changed in 1885.

No.	Size Taken Up.	Set.	Side.	Street.	Feet.	Location.
1	3	4	East	Alabama		At St. Clair st.
1	3	4	East	Columbus	10	South of Freeman st.
1	3	4	South	Davenport	334	East of Canfield st.
1	3	4	South	Davenport		At E. L. Clinton Park
1	3	4	West	Dodge	8	South of Superior st.
1	3	4	East	Dodge		At Walnut st.
1	3	4	West	Dodge		At St. Clair st.
1	4	6	North	Division		At E. L. Water Works property
1	4	4	South	Eagle	126	West of Wheeler Place, changed from corner of Wheeler Place
1	4	6	North	Euclid		At Sheriff St.
1	3	6	South	Euclid	232	East of Bond st.
1	3	4	North	Frankfort		At Bank st.
1	3	4	East	Huntington		At Herrick court
1	4	4	West	Huntington	201	North of Garden st.
1	3	4	North	High	70	West of Sheriff st.
1	3	4	South	Johnson		At Bank st.

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Hydrants changed in 1885.—Continued.

No.	Size Taken Up.	Set.	Side.	Street.	Feet.	Location.
1	3	4	East	Kennard		At Prospect st
1	3	4	South	Lorain		At Tracy st
1	3	4	South	Literary		At Herschell st
1	3	4	West	Muirson		At St. Clair st
1	3	6	East	Ontario	158	North of Huron st
1	3	6	East	Ontario	230	South of Huron st
1	3	4	North	Prospect	609	East of Erie st
1	3	4	North	Prospect	213	West of Huntington st
1	3	4	North	Prospect		At Cheshire st
1	3	4	South	Prospect	300	West of Willson ave
1	3	4	South	Prospect	304	East of Case ave
1	3	4	West	Perry	83	South of Sibley st
1	3	4	East	Perry	18	South of Garden st
1	3	4	East	Perry	8	North of Scoville ave
1	3	4	West	Perry	133	North of Hazen st
1	3	4	East	Perry		At Woodland ave

LOW SERVICE DISTRICT.

SCHEDULE Showing the Location of Hydrants changed in 1885.—Continued.

No.	Size Taken Up.	Set.	Side.	Street.	Feet.	Location.
1	3	4	North...	St. Clair..........		**At Canfield st.**..........
1	3	4	South...	St. Clair..........	478	**East of Canfield st.**..........
1	3	4	South...	St. Clair..........	298	**West of Ross st.**..........
1	3	4	North...	St. Clair..........		**At North Perry st.**..........
1	3	4	South...	St. Clair..........	183	**West of Buell st.**..........
1	3	4	North...	St. Clair..........	67	**East of Oliver st.**..........
1	3	6	East.....	Water..........	51	**North of Johnson, changed from the west side of street**..........
1	3		North...	Superior..........	160	**East of Water st., abandoned**..........

RECAPITULATION OF HYDRANTS FOR 1885.

3 inch Hydrants set in 1885	1
4 inch Hydrants set in 1885	219
6 inch Hydrants set in 1885	36
Total	256
Total Hydrants in use in Dec. 31, 1884	1,706
Total	1,962
Hydrants taken out in 1885	40
Total Hydrants in use in Dec. 31, 1885	1,922

Of 1,922 Hydrants in use 83 are 6 inch, the balance are 3 and 4 inch.

LOW SERVICE DISTRICT.

Cistern Connections Enlarged in 1885.

1 in St. Clair st., at Erie st., 3 inch to 6 inch; 1 in Water st., at St. Clair st.. 4 inch to 6 inch.

Cisterns Abandoned in 1885.

1 in Belden ave., at Superior st.; 1 in Columbus st., at Abbey st.: 1 in Davies st., at Broadway; 1 in Superior st., at Case ave.; 1 in Willson ave., at Woodland.

HIGH SERVICE DISTRICT.

SCHEDULE showing the Location of Fire Hydrants set in 1885.

No.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	6	East....	Atlantic st		At Bessemer ave	
1	4	East....	Atlantic st	290	North of Bessemer ave	
1	6	West....	Axtell st	14	South of Union st	
1	4	West....	Axtell st	297	South of Union st	
1	4	West....	Axtell st	298	South of Union st	
1	4	West....	Axtell st	493	South of Union st	
1	4	West..	Axtell st	301	North of Aetna st	
1	6	West....	Axtell st	14	North of Aetna st	
1	4	West....	Axtell st	173	South of Aetna st	
1	4	West....	Axtell st	303	South of Aetna st	
1	4	West....	Axtell st	74	South of Osage st	
1	4	West....	Axtell st	289	North of Marble st	
1	6	West....	Axtell st	15	North of Marble st	
1	4	South...	Bessemer ave	280	East of Atlantic	
1	4	South...	Bessemer ave	47	West of C. & P. R. R	
1	4	South...	Bessemer ave	246	West of Upton st	

HIGH SERVICE DISTRICT.

SCHEDULE showing Size, Number, and Location of Stop Gates set in 1885.

No.	Size.	Street.	Side.	Location.	Remarks,
1	20	Kinsman st.		On waste pipe of reservoir	
		Reservoir		50 feet W. of E, fence	
1	20	Union st	North	16 ft. S. of N. L. Union st., and 41 ft, E. of W. L. Woodland Hills ave	
1	20	Union st	North	W. L. Woodland Hills ave	
1	20	Union st	North	E. L. Upton st	
1	20	Union st	North	E. L. Axtell st., from the north	
1	20	Way st	North	9 feet S. of N. L. Way st., from the west, and 32 feet W. of E. L. Woodland Hills ave	
6		Total, 20 in. Stop Gates			
1	16	Harvard st	North	E. L. Broadway	
1	16	Kinsman st	North	W. L. Woodland Hills ave	
1	16	Miles st	North	W. L. Woodland Hills ave	Galvin Valve.
1	16	South Woodland ave	North	W. L. Woodland Hills ave	
4		Total, 16 in. Stop Gates			

HIGH SERVICE DISTRICT.

SCHEDULE showing Size, Number and Location of Stop Gates set in 1885.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	12	Axtell st	West	36 feet N. of S. L. Union st., and 15 feet E. of W. L. Axtell st	
1	12	Axtell st	West	S. L. Union st	
1	12	Axtell st	West	N. L. Aetna st., from the east	
1	12	Axtell st	West	S. L. Aetna st., from the east	
1	12	Axtell st	West	S. L. Osage st	
1	12	Axtell st	West	N. L. Marble st., from the east	
1	12	Broadway	West	S. L. Marble st	
1	12	Broadway	West	S. L. Axtell st	
1	12	Broadway	West	S. L. Jones ave	
1	12	Broadway	West	N. L. Harvard st	
1	12	Broadway	West	S. L. Harvard st	
1	12	Broadway	West	S. L. Hughes st	
1	12	Broadway	East	N. L. Niles st	
1	12	Fairmount st	South	W. L. Woodland Hills ave	
1	12	Harvard st	South	W. L. Broadway	
1	12	Harvard st	North	Between 16 inch and 12 inch pipes, 20 feet S. of N. L. Harvard st., and 10 feet W. of E. L. Broadway	

HIGH SERVICE DISTRICT.

SCHEDULE showing Size, Number, and Location of Stop Gates set in 1885—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	12	Marble st	South	E. L. Broadway	
1	12	Marble st	South	W. L. Axtell st	
1	12	Union st	South	E. L. Upton st	
1	12	Union st	North	16 feet E. of Upton st., and 23 feet S. of N. L. Union st	Connection Valve.
1	12	Union st	South	E. L. Axtell st., from the south	
1	12	Union st	South	W. L. Axtell st., from the south	
1	12	Woodland Hills ave	West	S. L. Fairmount st	
1	12	Woodland Hills ave	West	S. L. Norman st	
24		Total, 12 in. Stop Gates			
1	10	Atlantic st	East	N. L. Bessemer ave	
1	10	Aetna st	South	E. L. Axtell st., from the north	
1	10	Bessemer ave	South	E. L. Atlantic st	
1	10	Bessemer ave	South	49 feet W. of C. & P. R. R., at hydrant	
1	10	Bessemer ave	South	W. L. Upton st	
1	10	Union st	South	W. L. Woodland Hills ave	

HIGH SERVICE DISTRICT.

SCHEDULE showing Size, Number, and Location of Stop Gates set in 1885.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	10	Upton st.	East.	N. L. Union st.	
1	10	Upton st.	East.	N. L. Haddock st.	
1	10	Upton st.	East.	S. L. Bessemer ave.	
1	10	Woodland Hills ave.	West.	28 feet S. of N. L. Miles st., and 24 feet E. of W. L. Woodland Hills ave.	Connection Valve.
1	10	Woodland Hills ave.	West.	N. L. Miles st.	
1	10	Woodland Hills ave.	West.	S. L. Harvard st.	
1	10	Woodland Hills ave.	West.	N. L. Harvard st.	
1	10	Woodland Hills ave.	West.	N. L. Way st., from the west.	
1	10	Woodland Hills ave.	West.	S. L. Union st.	
1	10	Woodland Hills ave.	West.	N. L. Union st.	
1	10	Woodland Hills ave.	West.	N. L. Kinsman st.	
1	10	Woodland Hills ave.	West.	N. L. South Woodland ave.	
1	10	Warner road.	South.	W. L. Broadway.	
19		Total, 10 in. Stop Gates.			
1	8	Axtell st.	West.	N. L. Union st.	

HIGH SERVICE DISTRICT.

SCHEDULE Showing Size, Number, and Location of Stop Gates set in 1885.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	8	Broadway	East	S. L. Miles st	
1	8	Harvard st	South	W. L. Woodland Hills ave	
1	8	Harvard st	South	W. L. Sawyer st	
1	8	Harvard st	South	W. L. Elmo st	
1	8	Harvard st	South	E. L. Broadway	
1	8	Marble st	North	E. L. Axtell st	
1	8	Miles st	South	E. L. Broadway	
1	8	Miles st	South	W. L. Woodland Hills ave	
9		Total, 8 in. Stop Gates			
1	6	Axtell st	West	S. L. Marble st	
1	6	Axtell st	North	E. L. Broadway	
1	6	Brunner st	South	E. L. Broadway	
1	6	Canton st	South	W. L. Broadway	
1	6	Elmo st	West	N. L. Harvard st	
1	6	Fairmount st	South	E. L. Woodland Hills ave	

HIGH SERVICE DISTRICT.

SCHEDULE Showing Size, Number, and Location of Stop Gates set in 1885.—Continued.

No.	Size.	Street.	Side.	Location.	Remarks.
1	6	Hinman st.	South	W. L. Broadway	
1	6	Hughes st.	South	W. L. Broadway	
1	6	Jones ave.	North	E. L. Broadway	
1	6	Jones ave.	North	W. L. Broadway	
1	6	Miles Park ave.	South	E. L. Broadway	
1	6	Seager st.	South	E. L. Broadway	
1	6	Sawyer st.	West	N. L. Harvard st.	
1	6	Sawyer st.	West	S. L. Harvard st.	
1	6	Wire st.	South	E. L. Broadway	
1	6	Worley st.	South	W. L. Broadway	
1	6	Whitehead st.	North	E. L. Broadway	
1	6	Whitehead st.	West	S. L. Harvard st.	
1	6	Wales st.	West	N. L. Harvard st.	

HIGH SERVICE DISTRICT.

SCHEDULE Showing Size, Number, and Location of Stop Gates set in 1885.—Continued.

No.	Size	Street.	Side.	Location.	Remarks.
1	6	Walker st.	South	E. L. Broadway	
13	6	For Hydrants			
83		Total, 6 in. Stop Gates			
1	4	Leslie court	South	W. L. Broadway	
50	4	For Hydrants			
51		Total, 4 in. Stop Gates			

HIGH SERVICE DISTRICT.

Recapitulation of Stop Gates for 1885.

Water Way in Inches	36	30	24	20	16	12	10	8	6	4	3	Total.
Set previous to 1885		8	1	2	6	3						20
Set in 1885				6	4	24	19	9	33	51		146
Total in use Dec. 31, 1885		8	1	8	10	27	19	9	33	51		166

Stop Gates in Use in Both Districts Dec. 31st, 1885.

In Low Service District	3,920
In High Service District	166
Total	4,086

INVENTORY

Of Tools and Material on hand in Office, Basement and Yard December 31st 1885.

3	Calking hammers	2	Folding derricks
2	Sets of calking tools	2	Sets of differential blocks
5	Handles of calking tools	10	Center covers for cylinder V boxes
3	Straight calking tools	4	Wood hydrant wrenches
12	Gauges	1	Wood hydrant stuffing box
6	Cold sets	1	Wood hydrant valve seat
12	Chisels	1	Street sprinkler wrench
1	Monkey wrench	1	Cistern wrench
2	S wrenches	1	Die for manning hydrant
3	Crow bars	1	Chain for wood hydrant
9	Picks	1	Large S wrench
1	Axe	1	30 inch wrench
1	Adze	1	16 inch lever wrench
2	Grub hoes	4	6 inch wrenches
1	Sledge	3	3 inch wrenches
1	Hand Saw	1	4 inch Scowden wrench
1	Trowel	1	3 inch stop cock wrench
3	Yards duck cloth	1	⅝ inch stop cock wrench

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard, December 31st 1885.

25	Pounds white lead	1	Hydrant claw wrench
3	Balls of twine	3	Globe valves
1	New air cock	1	Air cock wrench
2	Old air cocks	1	Pair grappling tongs
4	Lanterns	1	Garden rake
11	Red globes for lanterns	6	Shovels
11	White globes for lanterns	2	Tunnelling shovels
4	Torch lamps	4	Brass pumps
4	Oil cans	1	4 inch pump
1	15 gallon oil can	3	Chairs
1	Grind stone	2	Mauls
2	Pair of scales	29	Manning hydrants in order
5	Goose necks for wood hydrants	1	Set of No. 1 plates for V boxes
17	3 inch valves, (old	2	Set of No. 3 inch plates for V boxes
10	3 inch valves, with goose necks	3	Set of No. 2 plates for V boxes
6	3 inch goose necks	1	3 inch sprinkler tee
1	Pair chain tongs	4	4 inch sprinkler tees
6	Leather valves for wood hydrants	3	6 inch sprinkler tees

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard, December 31, 1885.

10	Water pails	3	8 inch sprinkler tees
6	4 inch wood plugs	3	6 to 4 reducers
4	6 inch wood plugs	1	8 to 4 reducers
2	8 inch wood plugs	4	8 to 6 reducers
1	Pair 4 inch clamps	2	3 inch 1-16 bends
4	Pairs 6 inch clamps	1	4 inch 1-16 bends
8	Pairs 8 inch clamps	2	4 inch ⅛ bends
3	Pairs 12 inch clamps	3	6 inch 1-16 bends
6	3 inch clamp sleeves	10	6 inch ⅛ bends
6	4 inch clamp sleeves	1	8 inch 1-16 bends
10	6 inch clamp sleeves	6	8 inch ⅛ bends
6	10 inch clamp sleeves	2	10 inch ⅛ bends
1	12 inch clamp sleeves	1	3 inch elbow
100	Feet ½ inch steam hose	3	4 inch elbow
3	3 inch sleeves	1	6 inch elbow
3	4 inch sleeves	1	8 inch elbow
5	6 inch sleeves	2	8 inch tees
4	8 inch sleeves	1	4 inch tee

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard, December 31, 1885.

6	4 inch head sockets	3	3 inch pipe
3	4 inch covers	4	4 inch pipe
1	6 inch head socket	6	6 inch pipe
6	Bottom frames for V boxes	12	4 inch wood hydrants
12	Top frames for V boxes	12	6 inch wood hydrants
5	Covers	3	Furnaces and grates
5	Lead pots	6	⅝ inch brass plugs
1	16 inch valve (galvin.)	10	¾ inch brass plugs
2	30 inch screws, Boston Machine Co	20	1 inch brass plugs
1	Sprinkler top	4	Pairs tapping clamps, 4 in. and 6 in. and 12 in.
64	Feet ¾ chain, two hooks	1	Set of tools for tapping cement pipe
34	Feet ¾ chain, two hooks	1	2 inch reamers
30-6	Feet ¾ chain	216	½ inch brass ferrules
21-6	Feet ¾ chain, one clevis	228	⅝ inch brass ferrules
15	Feet ¾ chain, two hooks	75	¾ inch brass ferrules
12-6	¾ chain, one ring	14	1 inch brass ferrules
10	⅞ chain, hook and ring	2	6 inch valve wrenches
5-7	¾ chain, hook and ring	1	Combination valve wrench

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard, December 31, 1885.

3	Chains, without ring, for grappling hook	7	Stop cock wrenches
1800	Pounds of lead	7	Street washer keys
761	Pounds of brass scrap	20	Brass letter A plates
1	3-spring wagon, heavy	20	Brass letter B plates
1	Horse	37	Brass letter C plates
2	Sets of harness	20	Brass letter D plates
2	Tapping machines	20	Brass letter E plates
1	Pair ext. a hooks for same	26	Brass letter F plates
2	Machinist's hammers	9	Brass letter G plates
3	⅝ inch reamers	10	Brass letter H plates
2	¾ inch reamers	10	Brass letter I plates
1	1 inch reamer	6	Brass letter J plates
1	Cold chisel	1	Brass letter K plate
2	50-ft. tape lines	32	Brass number plates from 20,076 to 20,106
1	Lead pipe gauge	1	Monkey wrench
1	Hydrant wrench	2	Ratchets, bad order
2	Hose wrenches	3	Pails
1	2 inch alligator tong	1	Tool box

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard, December 31, 1885.

2	3 inch pipe tongs	1	¾ rope, 20 feet
4	1 inch pipe tongs	1	Monkey wrench
2	Pipe cutters	1	Square
2	Small pipe stocks	3	Reamers
1	Large pipe stock	1	Top wrench
6	Monkey wrenches	1	Plumber's furnace pot and ladle
2	Screw drivers	1	Rosin box
2	Oil cans	1	Soil pot
3	Trowels	1	1½ pump
3	Hammers	1	Shave hook
1	Hatchet	3	Wiping cloths
1	File	4	Drills
1	Socket wrench	4	Rubber heads for 3 inch meter
13	Stone cutter's tools	1	Sieve
1	Key-hole saw	4	⅝ inch meter counters for screws
2	Hand saws	2	1 inch meter counters for screws
2	2 inch dies	4	1½ inch meter counters for screws
2	1¼ inch dies	3	2 inch meter counters for screws

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard. December 31, 1885.

2	1¼ inch dies	7	1 inch meter counters for pins
4	1 inch dies	3	1½ inch meter counters for pins
4	¾ inch dies	1	2 inch meter counters for pins
3	½ inch dies	3	3 inch meter counters for pins
2	1½ stock guides	5	4 inch meter counters for pins
2	¾ stock guides	9	¾ inch meter ratchets
1	½ stock guides	17	1 inch meter ratchets
1	Stop cock wrench	8	1½ inch meter ratchets
1	Bar	7	2 inch meter ratchets
2	Picks	10	¾ inch meter ratchets, with counter plates
1	Hoe	7	¾ inch plugs
7	2 inch meter ratchets	9	1 inch plugs
2	2 inch meter ratchets, with counter plate	1	2 inch plug
4	4 inch meter ratchets	1	2½ inch plug
1	4 inch meter ratchet, with counter plate	1	3 inch cap
50	Old meter ratchets	1	4 inch plug
10	¾ inch meter counter plates	1	2½ inch to 2 inch bushing
5	3 inch meter ratchets	1	2 inch to 1½ inch coupling

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard December 31, 1885.

1	3 inch meter counter plate	21	2 inch nipples
8	1¼ inch to 1 inch bushings	29	1½ inch nipples
3	1½ inch to 1 inch bushings	73	1 inch nipples
1	1½ inch to ¾ inch bushings	153	¾ inch nipples
1	1½ inch to 1 inch bushings	6	2 inch unions
6	2 inch to 1½ inch bushings	5	1½ inch unions
21	1 inch to ¾ inch bushings	2	1¼ inch unions
1	2 inch to ¾ inch bushings	26	1 inch unions
2	1¼ inch to ¾ inch bushings	274	¾ inch unions
6	1 inch to ¾ inch couplings	30	¾ inch street elbows
1	¾ inch to ½ inch coupling	30	¾ inch elbows
1	2½ inch to 2 inch coupling	30	¾ inch couplings
1	2 inch to 1¼ inch coupling	10	1 inch elbows
1	1½ inch to 1 inch coupling	6	1 inch tees
2	1½ inch to 1¼ inch couplings	10	1 inch street elbows
1	2 inch to 1½ inch coupling	20	1 inch couplings
13	¾ inch lock nuts	2	Crosses, 1 to ¾
2	2 inch lock nuts	1	45° bend

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard, December 31, 1885.

[illegible]	½ inch lock nuts	8	2 inch elbows
[illegible]	1 inch lock nuts	2	2 inch tees
[illegible]	1 inch caps	2	2 inch couplings
[illegible]	1¼ inch caps	7	1½ inch elbows
[illegible]	¾ inch caps	20	Dials, from 2 inch to 1 inch
[illegible]	1½ inch street elbows	8	Meter covers
[illegible]	1¼ inch elbows	18	Barrels of cement
[illegible]	1¼ inch street elbows	187	Pounds of wrought iron scrap
[illegible]	1¼ x ¾ inch tees	127	Pounds of malleable iron scrap
	1 x ¾ inch tee	188	⅝ inch Worth meters, old
[illegible]	1¼ x 1 x ¾ inch tees	4	1 inch Worth meters, old
[illegible]	1¼ x 1 inch tee	8	1½ inch Worth meters, old
[illegible]	1¼ x ¾ inch tee	7	2 inch Worth meters, old
[illegible]	1½ inch couplings	2	3 inch Worth meters, old
[illegible]	1¼ inch coupling	2	3 inch Worth meters, old
[illegible]	Feet of 2 inch wrought iron pipe	8	⅝ inch Crown meters, old
[illegible]	Feet of 1 inch wrought iron pipe	4	1 inch Crown meters, old
[illegible]	Feet of 1½ inch wrought iron pipe	1	Union meter, new

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basemement and Yard, December 31, 1885.

130	Feet of ¾ inch wrought iron pipe	28	Balls of yarn
10	Feet of ½ inch wrought iron pipe	1	Package of round head screws
25	1 inch brass nipples	1	Package of flat head screws
20	¾ inch brass nipples	1	Package of air screws
4	2 inch meters, new	4	Bits, from ⅛ inch to 2 inch
1	1½ inch meter, new	1	Bit brace
15	⅝ inch meters, new	1	Force pump
80	Meter dials, old	1	Claw hammer
11	Gaskets for ⅝ inch meters	2	Washer cutters
12	Gaskets for 1 inch meters	2	Pairs of shears
1	Gasket for 3 inch meter	1	Drawing knife
2	Gaskets for 4 inch meters	1	Hack saw
2	Gaskets for 2 inch meters	1	Pair compasses
12	Gasket patterns	1	Callipers
3	Pounds of solder	1	Wood reamer
23	⅝ inch meter caps	1	1 inch tap
19	1 inch to 4 inch meter caps	1	Soldering iron
1	2 inch tap	1	Jack plane

INVENTORY—Continued.

Inventory of Tools and Material on hand in Office, Basement and Yard, December 31, 1885.

10	Meter spindles	1	Faucet
1	¾ inch tap	3	Tool boxes, with tools, lanterns, and complete outfits for pipe laying
1	Tool bag		
1	Tool box, complete outfit for pipe laying in Newburg		

INVENTORY OF OFFICE.

1	Ward robe	5	Pounds 56 inch muslin backed paper
5	Stools	15	Pounds 62 inch muslin backed paper
6	Heavy office chairs	6½	Pounds 20 inch cross section paper, 10 to the inch
6	Desk chairs, with screws	3	Service pipe record books
6	Chairs	2	Book of pipe record and eng. duty
4	Small tables	1	Record book of pipe in wards
1	Large table	1	Letter scale
1	Large pine table	1	50-foot steel tape
6	Desks	18	Permit books
1	Small Cupboard	2	Abstract of expenditures books
2	Large drafting tables	1	Miscellaneous bill book

INVENTORY.—Continued.

Inventory of Office.

1	Large drawing board	2	Time books
15	Drawing boards	5	Map books showing service connections
2	Bureaus for drawings, maps, plans of grounds, buildings, machinery, boilers, &c.	1	Safe
		1	Water cooler
1	Case for drawing papers	1	Transit
1	Case for annual reports of different cities	2	Pickets
1	Case for diagrams showing daily pumpage of water	1	100 feet chain, good
1	Blue print outfit office counter	1	100 feet chain, poor
1	Office counter, old	2	Y levels
	Cash Ledger Transfer } Books	2	Leveling rods

Inventory of Tools and Material at West Side Pumping Works, Dec. 31st, 1885.

2	Writing desks	1	Hand vise
4	Arm Chairs	1	Hat rack
10	Common chairs	2	Ink stands

INVENTORY.—Continued.

Inventory of Tools and Material at West Side Pumping Works, Dec. 31st, 1885.

4	Tables, with drawers	1	Book slate
1	Book case, with drawers	1	Mirror
3	Tool cupboards	1	Pall wrench, with drills and bits
1	Indicator	1	Steel yard scales, 2000 pounds
2	Thermometers	1	Platform scales
1	Barometer	1	Counter scales
3	Minute glasses	1	Portable engine and boiler
2	Planes, (jack and smooth)	1	Centrifugal pump and pipes
1	Axe	23	Bright-finish wrenches
1	Hand axe	35	Common wrenches
1	Hand saw	3	Copper hammers
5	Stoves	1	Set ¼ inch figures
3	Gauge cocks	2	Key wrenches
17	Lubricator glasses	2	Portable gas burners
¼	Box of Soap	20	Eye bolts
7	Rustic chairs, iron	4	Blacksmith tongs
1	Grindstone	1	Clock
1	Oil stone	64	Extra valve weights

INVENTORY.—Continued.

Inventory of Tools and Material at West Side Pumping Works, Dec. 31st, 1885.

1	Carpenters' square	4	Old piston rings, Cuyahoga engine
1	Pair car movers	1	Set of old rubber valves for Worthington pumps
1	Cross-cut saw	1	Barrel brimstone
1	Bellows and forge	12	Screens for suction wells
1	Portable forge	1	Pair compasses
5	Socket wrenches	2	Gas lighters
1	Lifting screw and ratchet	1	Gauge, 1½ inch
3	Vises and benches	1	Sickle
1	Pipe vise	1	Drawing table
1	Screw feed drill	2	Drawing boards
12	Cape chisels	2	Extra turn tables for railroad track
6	Flat chisels	2	Extra feed valves
2	Hack saw frames	12	Water gauge glasses, ¾
2	Chipping hammers	12	Water gauge glasses, ⅝
1	Combination pipe cutter	6	Round files
4	Step ladders	3	Flat files
4	Long ladders	6	Bastard files, 14 inch
4	Short ladders, for fire room	5	Bastard files, 12 inch

INVENTORY.—Continued.

Inventory of Tools and Material at West Side Pumping Works, Dec. 31st, 1885.

2	Dust pans	2	Half round files
4	Spittoons	2	Steam radiators, 6 inches long
1	Lounge	1900	Sewer brick
9	Tap wrenches	125	Fire brick
1	Post drill	15	Tile, 12x22x3 inches
1	Spirit level	8	Extra Valve seats, for Worthington pumps
1	Bull's eye lantern	14	Extra valve stems, brass
2	Tallow feed cups	1	Carpenter's bench and vise
1	Snow shovel	4	Derricks for gate wells
1	Screw driver	45	Extra valves, Henderson engine
[illegible]	Crow bars	8½	Barrels Fire Clay
2	Coal cars	½	Barrels salt
3	Traveler bars for cylinder heads	4	50 pound scale weights
2	Steam flue blowers	4	Slates
1	12 inch blank flange	1	Trestle for cylinder heads, etc
6	1¼ inch extra bolts	1	Blacksmith hammer
1	Winch	6	Dirt barrows
1	Blank flange for stand pipe	4	Coal barrows

INVENTORY.—Continued.

Inventory of Tools and Material at West Side Pumping Works, Dec. 31st, 1885.

1	Lawn mower	4	Extra valves for Cameron pump
1	Rake	3	Gate wheels, old
1	Scythe	6	Steel punches
2	Scoops	6	Packing hooks
5	Valve wrenches	6	Brass drip pans
2	Coal oil lanterns	4	Tin drip pans
3	Coal scuttles	14	Hand lamps
2	1 Gallon oil cans	4	Torches
3	4 Gallon oil cans	6	Glass lamps with chimneys
1	50 Gallon oil tank	4	Extra chimneys
1	60 Gallon patent oil tank and pump	5	Lbs. nails
3	Coal oil cans	1	Hair broom
1	Tallow can	4½	Bbls. cylinder oil
1	Tin oil pump	½	Bbl. black paint
4	Tin syringes	1	Hose nozzle
2	Brass syringes	5	Tape
20	Lbs. cotton waste	30	Ft. ¾ inch rubber hose, old
2	Doz. brooms	40	Ft. 1 inch rubber hose, old

INVENTORY.—Continued.

Inventory of Tools and Material at West Side Pumping Works, Dec. 31st, 1885.

10	Shovels	28	Joint bolts, ¾ & ⅞
1	Long handle shovel	12	Drills
1	Claw wrench	10	Calking tools
2	Boxes stove polish	7	Monkey wrenches
1½	Bbls. tallow	9	Double blocks
½	Bbls. coal oil	2	Double blocks, iron
40	Lbs. journal grease	5	Single wooden blocks
125	Lbs. old lead	3	Double blocks
18	Ft. ¾ round piston packing	1	Set of blocks for hoisting screens
11	Ft. 1½ round piston packing	3	Set of blocks for use in fire rooms
15	Ft. ¾ square piston packing	50	Fathoms 1¼ inch rope
15	Lbs. sheet rubber	15	Fathoms 1⅛ inch rope
3	Pair gas tongs	10	Fathoms ¾ inch rope
1	Record board	4	Fire pokers 11 feet long
1	Recording gauge, old	2	Long handle hoes
8	Fathoms ½ inch rope	2	High horses for platforms
19	Fathoms 3 inch rope	10	Water pails
26	Fathoms 3 inch rope	3000	Lbs. scrap iron

INVENTORY—Continued.

Inventory of Tools and Material at West Side Pumping Works, Dec. 31st, 1885.

9	Fathoms 2 inch rope	1	30 inch pipe, socket 6 feet 4 inches
100	Copper washers	1	30 inch pipe, socket 5 feet 8 inches
48	Extra grate bars 4½ feet long	1	30 inch pipe, socket 60 feet
26	Extra grate bars 3½ feet long	1	24 inch Reducing sleeve
1	Aqueduct gate	3	30 inch Sleeves
1	16 inch pipe	4	36 inch Sleeves
1	24 inch pipe 9 feet long, old	1	30 to 24 inch Reducer plain
1	24 inch pipe, new	1	3-Spring wagon
4	36 inch pipe	6	Extra deck plates for boilers
1	36 inch pipe 11 feet long	4	Record books
1	24 inch pipe, socket 3 feet	1	Coal book
1	24 inch pipe, socket 2 feet 6 inches	20	Lbs. copper scrap, estimated
1	24 inch pipe, socket 3feet 2 inches	25	Lbs. brass scrap, estimated
1	24 inch pipe, plain 3 feet	.75	Tons of coal stock, estimated
1	30 inch pipe, plain 3 feet 4 inches		

INVENTORY.—Continued.

Inventory of Stock and Material at West Side Reservoir, Dec, 31st, 1885.

1	4 inch pipe	1	16 inch pipe, plain, 8 feet
140	4 inch pipe, 8 feet long, old		16 in. pipe, sockets 3 ft. 6 in., 2 ft. 8 in., 2 ft. 3 in., 4 ft. 11 in, 5 ft.
25	4 inch pipe, 9 feet long, old		20 inch sockets 4 feet 10 inches to 6 feet 11 inches
46	4 inch pipe, 11 feet long, old	1	16 inch curve
29	6 inch pipe	2	16½ inch curves
68	6 inch pipe, 7 feet long, old	1	20 inch curve
	200 feet 6 inch pipe, plain pieces 7 to 8 feet	6	4 inch reverse curves
6	8 inch pipe	3	8 inch double curves
	300 feet 6 inch pipe, plain pieces 5 to 9 feet	11	4 inch crosses
	280 feet 8 inch pipe, plain pieces 7 to 10 feet	10	6 inch crosses
7	10 inch pipe	3	8 inch crosses
	29 feet 10 inch pipe, socket pieces 5 feet 4 inches to 9 feet	1	20 inch crosses
	48 feet 10 inch pipe, plain pieces 4 feet 6 inches to 10 feet 6 inches	2	6 to 4 inch crosses
2	12 inch pipe	1	8 to 6 inch crosses
2	16 inch pipe	1	10 to 8 inch crosses
5	20 inch pipe	20	4 inch crosses
9	24 inch pipe	13	4 inch crosses for cement pipe
8	30 inch pipe	1	4 inch sprinkler tee

INVENTORY.—Continued.

Inventory of Stock and Material at West Side Reservoir, Dec. 31st, 1885.

1	30 inch pipe 11 feet 8½ inches	6	6 inch tees
1	30 inch pipe 11 feet 10 inches	1	8 inch tees
1	30 inch pipe 6 feet 5 inches	2	10 inch tees
1	30 inch pipe 5 feet 7 inches	1	12 inch tees
1	30 inch pipe 3 feet 6 inches	6	6 to 4 inch tees
1	30 inch pipe 6 feet 6 inches	1	8 to 4 inch tees
1	30 feet pipe 3 feet 2 inches	3	8 to 6 inch tees
1	30 inch plain piece 3 feet 4 inches	2	10 to 8 inch tees
1	30 inch plain piece 4 feet 3 inches	2	16 inch tees, plain
1	36 inch pipe	10	4½ inch bends
1	36 inch pipe 11 feet 7 inches	11	6 1-16 inch bends
1	36 inch pipe 4 feet 2 inches	1	6½ inch bends
3	8 1-16 inch bends	4	16 inch socket clamps
27	8½ inch bends	2	20 inch socket clamps
5	10⅜ inch bends	2	24 inch socket clamps
4	4 inch elbows	1	30 inch socket clamps
4	6 inch elbows	2	36 inch socket clamps
2	10 inch elbows	1	30 inch socket clamps

INVENTORY.—Continued.

Inventory of Stock and Material at West Side Reservoir, Dec. 31st, 1883.

3	4 inch elbows	1	36 inch plug
2	3 inch valves	2	4 to 3 inch reducers
5	4 inch valves	1	6 to 3 inch reducer
1	16 inch valve	11	6 to 4 inch reducers
2	20 inch valves	20	8 to 6 inch reducers
5	3 inch valves with goose neck	14	10 to 6 inch reducers
2	Goose necks for 3 inch hydrants	1	10 to 8 inch reducer
17	3 inch sleeves	2	12 to 6 inch reducers
48	4 inch sleeves	1	12 to 10 inch reducer
17	6 inch sleeves	1	16 to 10 inch reducer
6	8 inch sleeves	1	16 to 12 inch reducer
1	10 inch sleeves	1	20 to 8 inch reducer
5	12 inch sleeves	8	No. 1 V box plates
8	16 inch sleeves	38	No. 2 V box plates
5	20 inch sleeves	85	No. 3 V box plates
2	24 inch sleeves	31	No. 4 V box plates
5	30 inch sleeves	22	Bottom frames
2	36 inch sleeves	45	Top frames

INVENTORY.—Continued.

Inventory of Stock and Material at West Side Reservoir, Dec. 31st, 1885.

4	16 inch clamp sleeves	46	V box covers
4	20 inch clamp sleeves	46	Hydrant tops
1	24 inch clamp sleeve	27	Bottom cylinders for manning hydrants
2	30 inch clamp sleeves	1	Furnace and lead pot
3	36 inch clamp sleeves	1	6 inch head socket
2	12 inch socket clamps		

Inventory of Tools, Pipe, and Material at Fairmount Reservoir, Dec. 31st, 1885.

52	Picks and handles	7	Cold sets
4	Mattocks	1	Dipper
8	Sledge hammers	1	C W W brand
4	Calking hammers	2	Yarning tools
2	Hand saws	13	Bars of lead
1	Axe	12	Water pails
2	Derricks	14	Pine plank 16 feet long
2	Pair of 12 inch blocks and ropes	2	Oak plank 18 feet long
6	Chains for pipe laying	2	Oak plank 12 feet long

INVENTORY.—Continued.

Inventory of Tools, Pipe, and Material at Fairmount Reservoir, Dec. 31st, 1885.

2	Furnaces and lead pots	3	36 inch pipe
3	Ladles	1	36 inch pipe 11 feet 8 inches
3	Tool boxes	2	36 inch curves
7	Crowbars	1	36 inch curves 4 feet 6 inches plain
6	Lanterns	1	36 inch curves 4 feet socket
2	One gallon oil cans	10	30 inch pipe
2	Ladle rests	3	30 inch pipe 11 feet 4 inches
2	Mattocks	1	30 inch pipe 11 feet 3 inches
12	Stone picks	2	30 inch pipe 11 feet 5 inches
1	Capstan bar	1	30 inch pipe 11 feet 6 inches
1	Street wrench	1	30 inch pipe 3 feet 4 inches with socket
1	Air cock wrench	1	30 inch pipe 3 feet 6 inches with socket
1	Monkey wrench	1	30 inch pipe 5 feet 3 inches with socket
1	Hydrant wrench	1	30 inch pipe 5 feet 8 inches with socket
1	Hose wrench	1	30 inch pipe 2 feet 2 inches with socket
1	Tape line	1	30 inch pipe 2 feet 4 inches with socket
1	Trowel	1	30 inch curve 4 feet
18	Calking tools	1	24 inch pipe 3 feet 9 inches plain

INVENTORY—Continued.

Inventory of Tools, Pipe, and Material at Fairmount Reservoir, Dec. 31st, 1885.

6	Calking tools with handles	1	24 inch pipe 3 feet 6 inches plain
7	Cold chisels	1	24 inch pipe 3 feet 2 inches plain
5	Cape chisels	1	12 inch pipe 4 feet plain
1	16 inch pipe	1	12 inch pipe 4 feet 6 inches plain
4	12⅛ inch bends	1	12 inch pipe 5 feet plain
1	6 inch gas tee	1	Wood hydrant 5 feet
1	6 inch elbow		
1	4½ bend		

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
January.	Pay rolls	Labor &c.	$165 25	$336 45	$1954 51	$1746 97		$151 75	$120 00	$210 00	$205 00				$4,889 93
	G. H. Barstow	Fire clay					$ 8 00								8 00
	J. A. Beidler & Co.	Coal	10 95												10 95
	W. Bingham & Co.	Packing &c.		1 21	1 00		76 24	32							78 77
	S. C. Brooks & Co.	Lumber			4 55										4 55
	H. P. Card	Coal				1449 01									1,449 01
	J. Chatterton	Boiler works					29 45								29 45
	J. Chatterton	Boiler works					363 17								363 17
	City of Cleveland	Paving	328 69												328 69
	Erie Telephone Co.	Tel. service			48 00										48 00
	Chafer & Becker	Machine labor										$87 00			87 00
	Cleve. Directory Co.	St. No. guides			4 50										4 50
	Cleveland gas Co.	Gas			13 18										13 18
	Farnan's brass w'ks	Elbow		1 25											1 25

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885.	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
January.	W. H. Ford	Use of horse & wagon			$12 00				$16 00						$28 00
	Wm. Gaul	Hauling ashes				$51 63									51 63
	Geo. R. Hell	Teaming	$12 00												12 00
	C. P. Jackson	Repair. chairs		$3 75											3 75
	W. G. LePelly	Joiner work										$8 25			8 25
	R. T. Lyon	Cement					$5 45								5 45
	T. Manning jr. & Co	Blacksmithing		18 04											18 04
	A. T. Osborne	Drawing paper			7 00										7 00
	Plain Dealer pub Co	Advertising	13 00												13 00
	People's gas Co.	Gas				66 70									66 70
	Chas. Rauch	Sled bobs		10 00											10 00
	D. T. Slater	Teaming	26 00												26 00
	Strong Cobb & Co.	Paint		2 00											2 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Pumping.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
January.	Sturtevant Lum. Co	Lumber										$[illegible] 10			$[illegible] 10
	Tug Bolton	Trip to Crib			$10 00										10 00
	Tug Jas. Amadues	Trip to Crib			5 00										5 00
	J. & F. M. Reynolds	Coal	$3 05												3 05
	C. M. Turner	Oil				$41 45									41 45
	VanDorn fence w'ks	Fence work					$43 00								43 00
	Worswick m'f'g Co.	Plumb'r fitt'gs		$1 07			22 71								24 [illegible]
	H. R. Worthington	Meters						$78 30							78 30
			$530 54	$374 07	$2005 74	$3,005 00	$548 07	$985 43	$130 00	$910 00	$305 00	$144 85			$7,005 40
February.	Pay Rolls	Labor &c.	$125 03	$423 51	$1001 78	$1701 11		$170 63	$130 00	$910 00	$305 00				$5,014 00
	G. H. Barstow	Fire clay					$8 00								8 00
	J. A. Beidler & Co.	Coal		3 05											4 00
	W. Bingham & Co.	Hardware		30 40		1 47		70							41 03

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
February.	F. & H. Born	Plumb'r goods		$25 90											$25 90
	Brooks & Co.	Stationery			$23 14										23 14
	H. P. Card	Coal				$2293 07									2,293 07
	J. Chatterton	Boiler repairs					$50 85								50 85
	Chafer & Becker	Estimate										$2126 00			2,126 00
	Chafer & Becker	Machine work										16 50			16 50
	City of Cleveland	Paving repairs	$31 62												31 62
	Day & Carter	Advertising	3 00												3 00
	Farnan's brass w'ks	Stuffing boxes		4 80					$0 36						5 16
	Chas. Fuhrman	Slabs		3 00											3 00
	Wm. Gaul	Hauling ashes				63 25									63 25
	Gibson & Price	Ten pipe		6 30											6 30
	E. W. Gleason	Boiler comp'd.				15 00									15 00
	Globe Iron works	Iron works					19 19								19 19

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
February.	Jno. J. Graves	Plumbing		$15 01											$15 01
	W. Harbaugh & Co.	Lard Oil				$31 20									31 20
	C. G. Hussey & Co.	Copper					$3 08								3 08
	M. E. Kavanaugh	Team		16 80											16 80
	Kennedy DeForest R & Co.	Repairing hyd.		7 00											7 00
	Leonard & Ellis	Valve line				207 05									207 05
	Huddleston	Thaw. cis. con.		9 00											9 00
	Lord, Bowler & Co.	Water valve	$22 00												22 00
	T. Manning jr. & Co.	Blacksmithing		17 84											17 84
	A. T. Osborne & Co.	Paper for map.			$12 00										12 00
	People's gas Co.	Gas				54 00									54 00
	W. H. H. Peck	Steam Hose		2 40											2 40
	W. H. Radcliffe	One pole		2 89											2 89

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
February.	J. B. Savage	Receipts			$22 00										$22 00
	Short & Forman	Litho. bonds			66 50										66 50
	W. P. Southworth	Brooms			1 79										1 79
	Standard Oil Co	Crude oil		$18 09											18 09
	Strong, Cobb & Co.	Soap				$1 89									1 89
	Sturtevant Lum. Co	Oak										$8 20			8 20
	Ward & Jackson	Blacksmithing		2 34											2 34
	Wing & Pellet	Lime					$1 00								1 00
	H. R Worthington	Meter fittings						$111 80							111 80
	Worswick Man. Co.	Plumb. fittings					19 54	4 76							24 30
	Cleveland Gas Co	Gas			10 70										10 70
	Henry Stuyemeur	Packing		5 10											5 10
			$741 79	$978 44	$4163 65	$7944 30	$650 63	$519 32	$256 38	$420 00	$410 00	$2334 05			$18,418 54

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Extension.	Engine House Repairs.	Meters.	[illegible]	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Cash.	Total.
March.	Pay Roll	Labor etc.	$185 75	$728 65	$1506 38	$1784 54		$197 65	$120 00	$210 00	$205 00			$300 00	$[illegible]
	A. Adams	Horse shoeing.		4 00											4 00
	Abram & Richards.					12 00									12 00
	G. H. Barstow						60 00								60 00
	J. A. Beidler		30 25												30 25
	W. Bingham & Co.	Hose valves &c		30 10			35 07	1 25							[illegible]
	F. & H. Born	Rep'rs to pump		6 50											6 50
	S. C. Brooks & Co.	Meter box						5 00							5 00
	Cleve. Tel. Co.	Tel. service			48 00										48 00
	Chafer & Becker	Estimate										$1798 00			1,798 00
	Chafer & Becker	Machine work.										44 00			44 00
	J. Chatterton	Machine work.					10 00								10 00
	Cleveland Gas Co.	Gas etc.		6 00	9 00										15 00
	Cleve. saw mill & Lum. Co.	Cord wood		20 25											20 25

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
March.	H. P. Card	Coal				$2647 94									$2,647 94
	Farnan's brass w'ks	Ferrules							$24 68						24 68
	W. H. Ford	Use of horse		$50 00											50 00
	Chas. Fuhrman	Wood		3 00											3 00
	Globe Iron works	Iron work					$42 35								42 35
	Jno. J. Graves	Plumbing		5 32											5 32
	Wm. Gaul	Teaming				67 38									67 38
	H. M. Hempy & Son	Plugs	$17 40												17 40
	M. E. Kavanaugh	Teaming		96 95											96 95
	Kennedy DeForest P & Co	Hydn't rep'rs		3 36											3 36
	Lake Shore F'ndry.	Pipe	7,216 27												7,216 27
	W. G. LePelly	Joiner work					8 95								8 95
	W. Long	Engn'r for St'r		84 00											84 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
March.	Lord, Bowler & Co.	Valves	$19 25												$19 25
	T. Manning jr. & Co	Blacksmithing		$28 32											28 32
	Merriam Morgan P Co.	Carbon oil				$4 42									4 42
	A. T. Osborne & Co.	Stationery												$16 36	16 36
	People's Gas Co.	Gas				61 70									61 70
	W. H. H. Peck	Hose		1 50											1 50
	Roehl Kuehn	Brick						$24 00							24 00
	Short & Foreman	Stationery			$1 90										1 90
	T. P. Spencer	Clerical service			30 00										30 00
	Standard Oil Co.	Crude oil		38 16											38 16
	Strong, Cobb & Co.	Oil		4 05											4 05
	Worswick m'f'g Co.	Met'r fit'gs etc					6 03	8 58							14 61
			$8,210 71	$2093 56	$5759 73	12532 28	$763 23	$746 23	$401 04	$680 00	$615 00	$4168 13	....	$376 86	$36,281 27

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
April.	Pay Rolls	Labor etc.	$2,795 28	$372 65	$1875 51	$1790 81		$211 13	$120 00	$212 00	$206 00			$100 00	$7,682 36
	Abram & Richards	Tallow				16 80									16 80
	Anzeiger Pub. Co.	Adv. wat'r r'nt			6 00										6 00
	G. H. Barstow	Fire clay				12 00									12 00
	J. A. Beidler & Co.	Coal	23 73												23 73
	W. Bingham & Co.	Packing etc.	44 68	1 13		44 47									90 28
	F. & H. Born	Lanterns	37 25												37 25
	Brooks & Co.	Stationery			4 35										4 35
	H. P. Card	Coal				1466 60									1,466 60
	Chafer & Becker	Machine work										$ 70 29			70 29
	Chafer & Becker	Estimate										833 00			833 00
	J. Chatterton	Boiler work					8 30								8 30
	City of Cleveland	Paving repairs	25 19												25 19
	Cleve. gas light Co.	Gas			9 00										9 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
April.	Cleveland Paper Co	Envelopes			$1 80										$ 1 80
	Cleve. wheelbarrow Truck Co.	Handles and wheels				$21 00									21 00
	Cuyahoga Fur. Co.	Machine work					$ 7 00								7 00
	Farnan's brass w'ks	Ferrules etc.							$136 00						136 00
	Florence iron w'ks	Fire hydrants	$ 420 00												420 00
	W. H. Ford	Use horse and wagon							110 00						110 00
	Wm. Gaul	Hauling coal				30 88									30 88
	Gibson & Price	Pig lead	1,302 01												1,302 01
	E. W. Gleason	Boiler scale preventor				15 00									15 00
	Globe Iron works	Machine work					20 57								20 57
	Jno. J. Graves	Plumbing	321 02												321 02

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885.	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
April.	Hugh Harrison	Hard brick						$10 00							$ 10 00
	H. M. Hempy	Wood plugs	$ 6 00												6 00
	C. G. Hussey	Copper					$ 4 10								4 10
	T. Ingraham	Machine waste				$48 59									48 59
	Lake Shore F'n'dry	Pipe	4,421 66												4,421 66
	R. T. Lyon	Cement					10 45								10 45
	Lord, Bowler & Co.	Valves	316 34												316 34
	T. Manning jr. & Co	Blacksmithing	22 30	56 78					$3 66						82 74
	McReynolds & Gawne	Estimate								$5,480 12					5,480 12
	A. T. Osborne	Engineer's sup			$11 63										11 63
	W. H. H. Peck	Opening street		15 05											15 05
	People's Gas Co.	Gas				36 10									36 10
	Penny Press	Advertising			8 00										8 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—Continued.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
April.	Plain Dealer Pub. Co	Advertising			$ 6 20									$15 67	$ 21 87
	J. B. Savage	Stationery			48 50										48 50
	D. Robertson	Final estimate											$8707 00		8,707 00
	D. T. Slater	Teaming	$29 50	$18 00											47 50
	W. P. Southworth	Pails		1 50											1 50
	Strong, Cobb & Co.	Soap			2 38										2 38
	Taylor Bros. & Co.	Stamp for bills			4 50										4 50
	Jno. Thompson	Steam fittings					$78 10								78 10
	Jane Trodden	Damage		20 00											20 00
	Upson Walton & Co	Paint			1 78										1 78
	White Sewing M. Co	Binding map			1 50										1 50
	Wood Bros.	Sewer pipe		1 70											1 70
	Worswick M'f'g Co.	Steam fittings		3 84				$ 7 11							10 95
	H. R. Worthington	Water Meters						400 70							400 70

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
April.	H. R. Worthington	Water Meters.	....	....	....	....	....	$390 53	....	....	....	....	....	....	$390 53
			$17,976 55	$2584 27	$7740 38	16013 53	$900 77	$1830 70	$770 72	$6,322 12	$820 00	$5066 42	$8757 69	$492 03	$69,275 18
May.	Pay Rolls............	Labor etc........	$5,939 66	$408 43	$1795 46	$1865 41	....	$370 56	$170 50	$213 50	$205 00	$180 00	....	....	$11,148 52
	F. H. Born............	Pump etc........	....	26 00	....	....	....	....	....	....	....	....	....	....	26 00
	W. Bingham & Co..	Packing, picks etc............	33 43	....	1 20	64 08	....	....	....	....	....	....	....	....	98 71
	Brooks & Co............	Time book........	....	....	3 00	....	....	....	....	....	....	....	....	....	3 00
	S. C. Brooks & Co...	Wedges............	33 25	....	....	....	....	....	....	....	....	....	....	....	33 25
	C. Burnside............	Tan bark............	....	....	22 75	....	....	....	....	....	....	....	....	....	22 75
	H. P. Card............	Coal............	....	....	....	2272 88	....	....	....	....	....	....	....	....	2,272 88
	Chafer & Becker.....	Machine work.	....	....	....	....	....	....	....	....	....	373 77	....	....	373 77
	City of Cleveland...	Paving repairs	132 05	....	....	....	....	....	....	....	....	....	....	....	132 05
	Cleve. gas light Co..	Fire clay & gas	....	12 00	8 90	....	....	....	....	....	....	....	....	....	20 90

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885. CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses	[illegible]	Engine House Expenses.	Meters.	Ferrules.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Total.
May.	Jno. J. Dolin	Inspecting pavement									$ 78 00				$ 78 00
	Farnan's brass w'ks	Ferrules etc.	$ 27 00	$ 2 00					$180 00						209 00
	Florence Iron w'ks.	Hydrants	2,000 00												2,000 00
	ForestCity stone Co	Sawed stone		13 11											13 11
	Freeman & Hall	Mason work									17 45				17 45
	Freeman & Hall	Estimate									4000 00				4,000 00
	W. H. Ford	Horse & wagon		26 00					78 00						104 00
	William Gaul	Hauling coal				$143 98									143 98
	Gibson & Price	Pig lead	600 31												600 31
	Jno. J. Graves	Plumbing	504 04												504 04
	Globe Iron works	Machine work.					654 80								654 80
	A.G.Harbaugh&Co.	Lard oil				30 67									30 67
	Hugh Harrison	Brick		10 00				[illegible]							[illegible]

ABSTRACT OF EXPENDITURER OF CLEVEDAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885.	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
May.	H. M. Hempy	Plugs	$ 10 00												$ 10 00
	Hogan & Harris	Ambulance	10 00												10 00
	T. Ingraham	Packing				$ 6 72									6 72
	Kennedy DeForest P & Co.	Hadrant pipe		$0 65											65
	Theodore Keegan	Sew'r pipe rep.	25 00												25 00
	Lord Bowler & Co.	Valves	1,106 20												1,106 20
	H. W. Lutkemyer	Mower knives				1 00									1 00
	R. T. Lyon	Cement		43 43											43 43
	Lake Shore F'ndry.	Pipe	19,916 91												19,916 91
	T. Manning jr & Co.	Blacksmithing	115 93	22 15	$1 12			$5 00	$20 69						164 89
	McReynolds & Gawne	Estimate								$13,171 81					13,171 81
	Walter Metcalf	Rep. Crib boat		6 00											6 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Furnaces.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	[illegible]	Total.
May.	A. T. Osborne	Blue print paper			$8 00										$8 00
	People's gas Co.	Gas				$28 40									28 40
	PlainDealer PubCo	Advertising											$12 00		12 00
	The Press	Advertising			4 00										4 00
	Rhodes Beidler Coal Co.	Coal	$ 5 75												5 75
	D. Robertson	Brick for vault						$98 40							98 40
	D. T. Slater	Teaming	56 25												56 25
	Strong Cobb & Co.	Coal oil		$5 00											5 00
	Sturtevant Lum. Co	Lumber	7 54	86											8 40
	Taylor, Kilpatrick & Co.	Towels			3 00										3 00
	Jno. Thompson	Steam fittings					$48 04								48 04

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
May.	Upson Walton & Co	Capstan bars	$ 1 84												$ 1 84
	Worswick m'f'g Co.	Plumb'r sup.	3 25	$38 73		$14 70		$ 29 07				$143 50			229 25
	H. R. Worthington	Water meters						1099 46							1,099 46
			$48,605 86	$3228 68	$9582 81	20446 67	$1013 61	$3446 52	$1220 86	$19,707 43	$5721 03	$5763 69	$8770 29	$492 03	127,999 48
June.	Pay Rolls	Labor	$7.122 19	$363 60	$1638 48	$1716 66	$90 75	$321 51	$274 00	$212 50	$205 00		$185 60	$60 00	12,190 29
	A. Adams	Horse shoeing.		6 25											6 25
	G. H. Barstow	Fire clay											45 00		45 00
	W. Bingham & Co.	Packing	84 60		85	62 12		1 20	1 15	10 40		43 31			203 63
	F. & H. Bern	Pump &c.		30 90											30 90
	W. P. Braund	Blacksmithing	19 30												19 30
	Brooks & Co.	Stationery			2 90										2 90
	H. P. Card	Coal				1647 19									1,647 19
	Chafer & Becker	Machinist Labor &c.										301 31			301 31

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	[illegible] Reservoir.	[illegible] Reservoir.	High Service Engine.	High Service Engine House.	[illegible]	Total.
June.	Chafer & Becker	Estimate										[illegible]			[illegible]
	Cleve. Teleph'ne C	Tel. service			$48 00										48 00
	Cleve. gas light Co.	Gas & Fire clay	$18 00		5 00										[illegible]
	A. Dall jr	Estimate											[illegible]		[illegible]
	A. Dall jr	Estimate											[illegible]		[illegible]
	Jno. J. Dolin	Inspecting paving									[illegible]				[illegible]
	R. Doty	Car fare &c										[illegible]			[illegible]
	Jno. Douglass	Mason work										[illegible]			[illegible]
	Farnan's brass w'ks	Ferrules &c	30 00	$40 42	7 50				[illegible]						[illegible]
	W. H. Ford	Use of horse & wagon		11 00				$10 00	[illegible]						[illegible]
	Wm. Gaul	Teaming				$100 13									[illegible]
	Gibson & Price	Pig lead.	1,002 27												[illegible]

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
June.	Globe Iron works	Blacksmithing					$21 13								$ 21 13
	Jno. J. Graves	Plumbing	$ 151 80												151 80
	H. M. Hempy & Son	Plugh	24 35												24 35
	C. G. Hussey & Co.	Copper											$ 14 70		14 70
	S. C. Kane	Mason work											564 56		564 56
	M. E. Kavanaugh	Teaming	7 00												7 00
	Kennedy DeForest P & Co.	Hydr'nt rep'rs.		$ 8 50											8 50
	Lake Shore F'ndry.	Pipe	18,597 00												18,597 00
	Leader printing Co	Advertising				$12 00									12 00
	Lord, Bowler & Co.	Valves	2,100 00												2,100 00
	R. T. Lyon	Louisville Cement					5 82	$28 13							33 95
	T. Manning jr. & Co.	Blacksmithing	79 59	21 57				2 60	$5 58						109 34

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—Continued.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Permanent Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
June.	McReynolds & Gawne	Estimate								[illegible]					[illegible]
	M. McGreal	Team	$34 50												34 50
	Walter Metcalf	Labor at Crib		$4 50											4 50
	A. T. Osborne & Co.	Pencils &c			$4 68										4 68
	People's gas Co.	Gas				$30 70									30 70
	W. Quinn	Coal	32 00												32 00
	Rhodes Beidler Coal Co.	Coal	15 15												15 15
	J. F. Rothgarry	Iron wedges											[illegible]		[illegible]
	J. B. Savage	Stationery			58 50										58 50
	Scott & Downer	Estimate												[illegible]	[illegible]
	D. T. Slater	Teaming	54 00												54 00
	Upson Walton & Co	Capstan bars	7 62												7 62

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
June.	Variety iron works	Repairing water pipe										$106 62			$ 106 62
	Vincent, Barstow & Co.	Stool			$4 50										4 50
	Ward & Jackson	Blacksmithing		$ 1 30											1 30
	J. T. Watterson	Fence										50 00			50 00
	A. A. Whittemore	Tel. fixtures			2 50										2 50
	Wing & Pellet	Lime				$1 00									1 00
	Wood Bros.	Curve	$ 9 70												9 70
	R. D. Wood & Co.	Hydrant	1,584 00												1,584 00
	Worswick Mfg. Co.	Plum'r fitt'ngs		31 40				$8 78							40 18
	Geo. Worthington & Co.	Valves	455 00												455 00
	Frank Young	Slating					$25 75								25 75

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Extension.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
June.	Short & Forman	Stationery			$21 50										$21 50
			$80,683 83	$3751 12	11378 12	24085 47	$1147 00	$[illegible] 74	$1702 [illegible]	$34,482 [illegible]	[illegible]	$7[illegible] 54	[illegible] 04	$3148 00	$[illegible] 44
July.	Pay rolls	Labor &c.	$8,050 51	$300 00	$1742 00	$1751 01		$[illegible]	$172 25	$292 50	$245 00		$90 00	$90 00	13,017 33
	A. Augstadt	Blacksmithing					$10 70								10 70
	G. H. Barstow	Fire Brick											100 00		100 00
	Bell, Cartright & Co	Lumber	11 02												11 02
	W. Bingham & Co.	Packing	68 58	20		24 17		1 73			25 00				119 68
	F. & H. Born	Globes		18 00											18 00
	Brooks & Co.	Rubber bands			1 25										1 25
	C. Brunner	Damage	31 50												31 50
	S. C. Brooks & Co.	Meter boxes	10 32					70 00							80 32
	Buckeye Broom Co.	Brooms				5 00									5 00
	H. P. Card	Slack				1008 84									1,008 84

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
July.	Chafer & Becker	Machinist w'k										$117 31			$117 31
	Chafer & Becker	Estimate										425 00			425 00
	City of Cleveland	Relay pavem't	$1,740 95												1,740 95
	Cleveland Gas Co.	Gas			$4 80										4 80
	Cleve. Saw Mill & Lumber Co.	Wood	4 50												4 50
	A. Doll, Jr.	Estimate											21436 58		21,436 58
	A. Doll, Jr.	Mason work											51 70		51 70
	R. Doty	Car fare										3 85			3 85
	John Douglass	Mason work											93 40		93 40
	Farnan's brass w'ks	Ferrules							$49 20						49 20
	W. H. Ford	Use of horse & wagon							68 00						68 00
	Freeman & Hall	Estimate									$3000 00				3,000 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
July.	Wm. Gaul	Teaming				$40 00									$40 00
	Gibson & Price	Pig Lead	$2,087 85												2,087 85
	Globe Iron Works	Blacksmithing					$15 02								15 02
	John J. Graves	Plumbing	97 02												97 02
	Hugh Harrison	Brick	35 00					$38 33							73 33
	H. M. Hempy & Son	Plugs	20 00												20 00
	H. C. Herron	Monum't stone									$6 95				6 95
	Kennedy, DeForest P & Co.	Repairing hyd.		$20 18											20 18
	S. C. Kane	Mason work											$673 40		673 40
	Lord, Bowler & Co.	Valves	1,344 50												1,344 50
	L. Shore Foundry	Pipe	21,452 74												21,452 74
	R. T. Lyon	Cement											94 95		94 95
	J. B. McKee	Medical att'nd	10 00												10 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
July.	M. M. Greal..........	Teaming.........	$88 37	....	....	....	....	....	....	....	....	....	....	....	$88 37
	McReynolds & Gawnes..........	Estimate.........	....	....	....	....	....	....	....	$25,365 63	....	....	....	....	25,365 63
	T. Manning jr.& Co	Blacksmithing	37 42	$38 94	....	....	....	....	$4 56	....	....	....	....	....	80 92
	Merriam, Morgan P Co..................	Head light oil.	....	....	....	$ 5 20	....	....	....	....	....	....	....	....	5 20
	R. Mitchell & Sons.	Sewer pipe......	3 00	....	....	... .	....	....	....	... .	....	....	....	....	3 00
	A. T. Osborne & Co	Drafting sup...	....	.. ..	$ 3 90	....	....	....	....	....	....	....	....	....	3 90
	Peerless Prtg. Co....	Printing.........	....	....	138 06	....	....	....	....	....	....	.. ..	....	....	138 06
	People's Gas Co.....	Gas	....	. .....	.. ..	31 89	....	....	....	....	....	....	....	....	31 89
	Wm. Quinn......	Teaming.........	75 56	....	....	....	....	....	....	....	....	....	....	....	75 56
	Rhodes Beidler Coal Co..................	Coal...	29 58	....	....	....	....	....	....	....	....	....	....	....	29 58
	J. B. Savage....... ..	Printing.........	....	....	34 50	....	....	....	....	....	....	....	....	....	34 50

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
July.	D. T. Slater	Teaming	$ 59 75												$59 75
	Scott & Downer	Estimate												$849 80	849 80
	Sterling & Co	Wind'w shad's			$7 85										7 85
	Strong, Cobb & Co.	Coal Oil		$ 1 80											1 80
	Strong, Cobb & Co.	Lead & Oil		27 59											27 59
	Upson, Walton & Co	Rope etc	11 00												11 00
	A. D. Wade	Building fence									$932 74				932 74
	Ward & Jackson	Blacksmithing	25 80												25 80
	Wood Bros	Sewer pipe	6 00												6 00
	R. D. Wood & Co	Hydrants	1,584 00												1,584 00
	Woods, Perry & Co.	Fencing&posts									96 07				96 07
	Worswick Mfg. Co.	Plumb. fittings		11 00				$ 74 33							85 33
	Geo. Worthington	Valves	910 00												910 00
	H. R. Worthington.	Water Meters.						1300 07							1,300 07

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
July.	Scott & Downer	Extra work												$6999 75	$6,999 75
			118,445 63	$4228 95	13310 57	27852 30	$1179 68	$5581 93	$2086 89	$60,100 71	$8834 17	$8951 70	47712 62	10079 28	317,967 52
August.	Pay Rolls	Labor	$8,283 39	$364 14	$1740 13	$1719 70		$228 75	$180 45	$252 50			$90 00	$110 00	12,969 06
	P. Ader & Co.	Stop cock box							2 50						2 50
	Bell Cartwright & Co	Posts									$1 48				1 48
	W. Bingham & Co.	Packing etc.	59 67					4 90			6 47				71 04
	P. & H. Born	Lantern globes		13 60											13 60
	W. P. Braund	Blacksmithing	30 52												30 52
	Brooks & Co.	Stationery			2 60										2 60
	W. Buchman	Labor						8 00							8 00
	Chafer & Becker	Machine work										$497 71			497 71
	H. P. Card	Coal				30 24									30 24
	. P. Card	Coal				1121 97									1,121 97

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885. CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Total.
August.	City of Cleveland...	Paving repairs	$ 2,000 00													[illegible]
	Cuy'hoga steam Fur	Machine work					$ 6 00					$148 00				[illegible]
	Cleve. Directory Co	Directory... ..			$ 5 00											5 00
	Cleveland Gas Co ..	Fire clay & gas	12 00		5 00											17 00
	Jno. Douglass... .	Mason work.											$ 88 00			88 00
	Farnan's brass wk's	Ferrules							$100 00							100 00
	A. Doll Jr.........	Estimate. .											[illegible]			[illegible]
	W. H. Ford	Use of horse & wagon.							40 00							40 00
	Wm. Gaul	Hauling ashes				$10 75										[illegible]
	Gibson & Price	Pig Lead	1,000 01													1,000 01
	E. W. Gleason..	Boiler scale preventive..				15 00										15 00
	Globe Iron works...	Blacksmithing					19 04									19 04

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
August.	Jno. J. Graves	Plumbing	$317 09												$317 09
	H. M. Hempy	Plugs	36 50												36 50
	E. H. Jones & Co.	Screws						$1 50							1 50
	S. C. Kane	Mason work											$242 60		242 60
	Kemmer & Kushm'n	Cleaning walls				$ 50 00									50 00
	Lake Shore Foundry	Pipe	12,429 68												12,429 68
	Leader printing Co.	Advertising				25 20				$ 91 80	$18 00				135 00
	Leonard & Ellis	Valvoline				300 96									300 96
	Lindsey Kile & Co.	Coal				38 40									38 40
	Lord, Bowler & Co.	Valves	1,786 10												1,786 10
	R. T. Lyon	Cement											33 95		33 95
	T. Manning jr. & Son	Blacksmithing	62 92	$2 73					$17 89						83 54
	M. McGreal	Teaming	105 86												105 86
	McReynolds & Co.	Mason work								215 01					215 01

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Eastern Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
August.	McReynolds & Gawne.	Estimate								$17,841 84					$17,841 84
	A. T. Osborne	Paint									$30 83				30 83
	W. H. H. Peck	Rubber Gasket		$1 05											1 05
	People's Gas Co.	Gas				$30 40									30 40
	W Quinn	Teaming	$66 25												66 25
	D. Robertson	Rails											$80 00		80 00
	Scott & Downer	Estimate												$4067 00	4,067 00
	W. P. Southworth	Pails		00											00
	Short & Forman	Blank Books			$3 50										3 50
	D. T. Slater	Teaming	26 00			1 00									27 00
	Thos. Stefen	Laborer											30 00		30 00
	Strong, Cobb & Co	Coal oil		4 20											4 20
	Mrs. Jno. Turba	Livery	1 50												1 50

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
August.	Upson Walton & Co	Rope	$ 1 66	$ 2 04											$ 3 70
	A. T. Vantassel&Co	Hardware				$23 77									23 77
	Wæchter am Erie	Advertising			$5 33										5 33
	A. D. Wade	Labor									$ 32 00				32 00
	A. D. Wade	Joiner work									125 50				125 50
	Ward & Jackson	Blacksmithing	28 40	2 75				$ 0 40							31 55
	A. D. Wood & Co	Hydrants	1,488 00												1,488 00
	Wood Bros.	Sewer work	45 10												45 10
	Woods Perry & Co.	Lumber									214 92				214 92
	Worswick M'f'g Co.	Plumb'r fitt'gs		48 43											48 43
	H. R. Worthington	Meters						166 35							166 35
	G. Worthington&Co	Valves	455 00												455 00
			147,213 87	$4609 69	15072 33	31255 78	$1198 61	$5991 83	$2450 28	$78,491 65	$9762 37	$8734 42	53681 67	14226 78	372,749 28

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
September.	Pay Rolls..........	Labor etc......	$8,516 31	$314 01	$1807 31	$1845 10	....	$254 64	$170 50	$296 75	....	....	....	$110 00	$13,343 68
	A. Adams	Horse shoeing.	....	4 00	....	....	....	....	....	....	....	....	....	....	4 00
	Aetna Grate Co. ...	Grate bars......	....	....	....	....	$64 08	....	....	....	....	....	....	....	64 08
	A. Angstadt...........	Boiler repairs.	....	....	....	....	5 05	....	....	....	....	....	....	....	5 05
	G. H. Barstow.	Fire brick.......	....	....	....	....	83 00	....	....	....	....	....	....	....	83 00
	BellCartwright&Co	Oak...............	....	....	....	....	8 08	....	....	....	....	....	....	....	8 08
	W. Bingham & Co.	Hardware......	23 42	....	....	....	....	13 17	....	....	$0 30	....	....	....	36 89
	S. C. Brooks & Co...	Meter boxes&c	7 05	....	....	....	....	21 90	....	....	....	....	....	....	28 95
	H. P. Card	Coal...............	....		....	583 40	....	....	....	....	....	....	....	....	583 40
	Pat Carry	Damage.........	70 00	....	....	....	....	....	....	....	....	....	....	....	70 00
	Chafer & Becker.....	Iron work........	....	....	....	....	....	....	....	....	....	$78 49	....	....	78 49
	City of Cleveland...	Paving............	2,706 00	....	....	....	....	....	....	....	....	....	....	....	2,706 00
	Claflin paving Co...	Paving repairs	1,407 40	....	....	....	....	....	....	....	....	....	....	....	1,407 40
	Clev.div.Erie tel.Co	Tel. service.....	....	....	48 00	....	....	....	....	....	....	....	....	....	48 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885.	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount. Reservoir.	Kinsman. Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
September.	Cleveland Gas Co.	Gas			$6 10										$ 6 10
	Cleveland Paper Co	Stationery			4 50										4 50
	Common Sense Packing Co.	Packing				$83 25									83 25
	Geo. Cooper & Co.	Canvass duck		$1 50											1 50
	A. Dall jr	Estimate											$5332 90		5,332 90
	A. Dall jr.	Mason work											23 75		23 75
	Jno. Douglass	Boiler cov'ring					$16 00								16 00
	Edwards Townsend & Co.	Soap				5 35									5 35
	Evans Bros. & Co.	Estimate									$382 50				382 50
	Farnan's brass w'ks	Ferrules							$64 57						64 57
	W. H. Ford	Use horse and wagon			10 00				20 00						30 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
September.	Forest City Stone Co	Flagging		$2 35											$ 2 35
	Freeman & Hall	Making road									$45 82				45 82
	Wm. Gaul	Teaming				$30 25									30 25
	Gibson & Price	Pig lead	$1,510 15												1,510 15
	Jno. J. Graves	Plumbing	643 10												643 10
	Hugh Harrison	Brick						$78 83							78 83
	H. M. Hooper & Son	Plugs	7 55												7 55
	C. O. Hussey & Co	Circles				8 70									8 70
	T. Ingraham	Waste				50 43									50 43
	S. C. Kane	Mason work											$197 08		197 08
	Lake Shore F'ndry	Pipe	14,548 48												14,548 48
	Lord, Bowler & Co	Valves	1,546 00												1,546 00
	C. H. Lyon	Joiner work											2 00		2 00
	R. T. Lyon	Cement					$29 10								29 10

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
September.	W. McReynolds&Co	Mason work								$ 73 70					$ 73 70
	McReynolds & Gawne	Estimate								8,379 06					8,379 06
	T. Manning jr. & Co	Blacksmithing	$28 30												28 30
	A. T. Osborne & Co.	Paint									$13 40				13 40
	People's Gas Co	Gas				$32 90									32 90
	Rhodes Beidler&Co	Coal	10 50												10 50
	J. B. Savage	Printing			$91 00										91 00
	Scott & Downer	Estimate												$1164 00	1,164 00
	Scott & Downer	Timber work												11229 25	11,229 25
	Scott & Downer	Labor												230 00	230 00
	O. Sherwood	Use of lighter												12 00	12 00
	D. T. Slater	Teaming	65 00												65 00
	H. Strigemeur	Packing	15 86	$3 00								$56 70			75 56

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885.	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Furnaces.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
September.	Stout VanWickle & Co.	Coal				$22 14									$22 14
	Strong, Cobb & Co	Oil		$2 25											2 25
	Strong Cobb & Co	Oil		5 82											5 82
	Jno. Thompson.	Machine work.					$7 30								7 30
	Tug R. K. Hawley	To & from crib												$4 00	4 00
	J. Turton	Painting				220 05									220 05
	Upson Walton & Co	Rope etc	$5 10											1 20	6 30
	A. D. Wade	Labor									$78 80				78 80
	Ward & Jackson.	Blacksmithing	59 90	1 10										6 75	67 75
	J. T. Watterson	Carpenter w'k											$88 25		88 25
	Wing & Pollet.	Lime					1 00								1 00
	Wood Bros	Sewer pipe	90												90
	R. D. Wood & Co.	Hydrants	1,027 00												1,027 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
September.	Worswick Mfg. Co.	Pipe fittings	....	$ 10 00	....	....	....	$ 13 23	....	....	....	....	....	....	$ 23 23
	Geo. Worthington	Valves	$ 1,142 82	....	....	....	....	....	....	....	....	....	....	....	1,142 82
	H. C. Herron	Award acc't Freem'n&Hall	....	....	....	....	....	....	....	....	$3567 92	....	....	....	3,567 92
			181,153 70	$5043 72	17039 24	34147 41	$1412 20	$6373 60	$2075 35	$87,240 15	13849 16	$6860 61	59823 68	28973 96	444,131 78
October.	Pay Rolls	Laborers etc.	$ 5,680 55	$ 347 32	$1772 83	$1799 01	....	$ 239 76	$ 175 75	$ 215 75	....	....	....	$160 00	$10,390 97
	Anzeiger Pub. Co.	Advertising	....	....	6 00	....	....	....	....	....	....	....	....	....	6 00
	A. Angtsadt	Boiler works	....	....	....	....	$ 1 38	....	....	....	....	....	....	....	1 38
	BellCartwright&Co	Lumber	2 27	....	....	....	....	....	....	....	....	....	....	....	2 27
	W. Bingham & Co.	Hose packing	20 44	1 85	....	38 14	....	....	....	....	$1 80	$ 41 08	....	....	103 31
	Brooks & Co.	Printing	....	....	6 00	....	....	....	....	....	....	....	....	....	6 00
	Chafer & Becker	Machine work.	....	....	....	....	....	....	....	....	....	532 90	....	....	532 90
	Chafer & Becker	Machine work.	....	....	....	....	....	....	....	....	....	192 65	....	....	192 65

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1880. CONTINUED.

1880.	To Whom Paid.	For	Pipe Extension.	[illegible] Repairs.	[illegible] Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
[illegible]	City of Cleveland	Paving repairs	$1,500 23												$1,500 23
	Cleve. gas Co.	Fire-clay, Altna	6 00		$7 00										13 00
	W. F. Crane	St. Sprinkling			14 00										14 00
	Cleveland paving Co.	Relay paving	11 85												11 85
	A. Hall jr.	Mason work											$143 75		143 75
	A. Hall jr.	Estimate											977 00		977 00
	Evans Bro. & Co.	Estimate									$510 00				510 00
	Evans Bro. & Co.	Out House									10 50				10 50
	Fareman's brass wks.	Ferrules		$3 09					$205 01						208 10
	C. Fay	Wood		22 50											22 50
	W. H. Ford	Use of horse		4 00	18 00				32 00						54 00
	William Gaul	Hauling ashes				$40 75									40 75
	Gibson & Price	Pig lead	800 00												800 00
	Globe Iron works	Boiler works					$75 31								75 31

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
October.	I. C. Yoff	Coal				$18 72									$18 72
	John J. Graves	Plumbing	$411 28												411 28
	A. Y. Harbaugh	Lard Oil				29 15									29 15
	H. M. Hempy & Son	Wood plugs	9 55												9 55
	R. Hegin M. D.	Medic'l service	11 00												11 00
	Industry File w'ks.	Files			$ 4 00										4 00
	S. B. Grummond	Submarine diving												$933 60	933 60
	R. Johnson	Coal				20 85									20 85
	S. C. Kane	Mason work											$64 60		64 50
	Kennedy DeForest P & Co.	Plungers		$1 40											1 40
	F. A. Kemsies	Drafting			80 00										80 00
	M. G. Kolb	Medical att'nd	15 00												15 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
October.	Lake Shore F'ndry.	Pipe	$10,732 98												[illegible]0,732 98
	Leader Printing Co	Proposals								$ 18 80	$ 9 80				27 60
	W. G. LePelly	Repair scale					$ 17 88								17 88
	Lord Bowler & Co.	Valves	1,025 30												1,025 30
	R. T. Lyon	Cement								11 64					11 64
	T. Manning jr & Co.	Iron Bridges								1,530 00					1,530 00
	MorganRunCoalCo	Coal				$ 53 28									53 28
	NewEnglandHotel.	Board for div'r												$ 79 00	79 00
	T. Manning jr. & Co	Blacksmithing	32 08	5 18											37 26
	Ohio Belting Co	Valves					37 00								37 00
	A. T. Osborn & Co.	Paint									15 00				15 00
	People's Gas Co	Gas				35 20									35 20
	PlainDealer PubCo	Advertising			$10 07										10 07
	Rhodes Beidler Coal Co.	Coal	16 85												16 85

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
October.	T. J. Saundercock	Mason work								$ 25 00					$ 25 00
	D. T. Slater	Teaming	$ 29 00												29 00
	H. Stegemier	Twine, etc	38 48												38 48
	Scott & Downer	Estimate												$4615 75	4,615 75
	Strong, Cobb & Co.	Lard oil				$ 2 96									2 96
	Strong, Cobb & Co.	Coal oil		$ 1 80											1 80
	TodStambaugh&Co	Coal				1,448 55									1,448 55
	Upson Walton & Co	Rope, etc.												11 76	11 76
	J. H. VanDorn & Co	Estimate								527 00					527 00
	Ward & Jackson	Blacksmithing	34 42											25 47	59 89
	R. D. Wood & Co.	Hydrants	1,908 00												1,908 00
	A. D. Wade	Labor									$ 120 00				120 00
	Woods Perry & Co.	Pickets									4 80				4 80
	G. Worthington	Water gates	360 00												360 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
October.	Worswick m'f'g Co.	Plub'r fittings	....	$10 25	....	....	....	....	$3 32	....	....	....	....	....	$ 13 57
	H. R. Worthington	Meters	....	....	....	....	....	$1944 08	....	....	....	....	....	....	1,944 08
			203,958 94	$5440 57	18088 13	37040 01	$1543 77	$8557 44	$3122 08	$89,567 84	14526 56	$9636 24	60509 43	32799 54	486,290 50
November.	Pay Rolls	Labor	$6,357 51	$311 50	$1824 31	$1701 66	$36 50	$227 75	$170 50	$328 12	$76 05	$226 56	....	$65 00	10,325 46
	A. Angstadt	Boiler work	....	....	....	....	10 06	....	....	....	....	....	....	....	10 06
	S. C. Barnes	Boiler cov'ring	....	....	....	....	....	....	....	....	....	153 00	....	....	153 00
	David Berliner	Labor	69 00	....	....	....	....	....	....	....	....	....	....	....	69 00
	W. Bingham & Co.	Hardware	6 93	2 55	....	14 32	....	....	....	8 44	....	75	....	....	32 99
	W. P. Braund	Blacksmithing	5 23	....	....	....	....	....	....	....	....	....	....	....	5 23
	J. F. Broman	Rem'v'g earth	32 82	....	....	....	....	....	....	....	....	....	....	....	32 82
	S. C. Brooks & Co.	Meter boxes	....	....	....	....	....	34 40	....	....	....	....	....	....	34 40
	F. & H. Born	Burner	....	82	....	....	....	....	....	....	....	....	....	....	82
	Brooks & Co.	Stationery	....	....	2 00	....	....	....	....	....	....	....	....	....	2 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
November.	Chafer & Becker	Machine work										$175 12			$ 175 12
	City of Cleveland	Paving	$ 397 00												397 00
	Cleveland Gas Co	Gas			$11 90										11 90
	Cleve. saw mill Co	Timber		$11 12											11 12
	Cleve. wheelbarrow Truck Co	Wheelbarrow				$ 25 00									25 00
	Ogden Crittendon	Rep. regulator					$ 7 50								7 50
	A. Doll jr	Stone cutting											$ 270 80		270 80
	A. Doll jr	Estimate											1343 85		1,343 85
	Thos. Davis	Boiler comp'd.				28 12									28 12
	Evans Bros. & Co.	Estimate									$272 50				272 50
	Tug Florence	Trip to Crib												$3 00	3 00
	W. H. Ford	Use of horse & wagon		4 00	8 00				$42 00						54 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885.	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
November.	Forest City Ice Co.	Ice			$11 64										$ 11 64
	Wm. Gaul	Hauling ashes				$52 25									52 25
	Gibson & Prior	Pig Lead	$292 34												292 34
	Globe Iron Works	Blacksmithing				8 81				$110 81					119 62
	Jno. J. Graves	Plumbing	612 88												612 88
	R. Greenalgh	Trip to Crib												$36 00	36 00
	Hugh Harrison	Brick						$60 50							60 50
	H. M. Hempy	Wood plug	5 10												5 10
	LakeShore Foundry	Pipe & specials	5,507 76												5,507 76
	Leader printing Co.	Advertising			11 25										11 25
	W. G. LaPolly	Joiner work										$26 81			26 81
	Lord, Bowler & Co.	Valves	493 40												493 40
	R. T. Lyon	Cement								24 25					24 25
	Andrew McCormick	Estimate								197 63					197 63

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
November.	T. Manning jr. & Co	Bridge work								$ 70 05					$ 70 05
	T. Manning jr. & Co	Estimate								1,496 00					1,496 00
	T. Manning jr. & Co	Blacksmithing	$14 30	$5 89											20 19
	Merchant's Ins. Co.	Insurance									$10 00				10 00
	Merriam & Morgan	Carbon oil		4 49											4 49
	Walter Metcalf	Labor												$49 20	49 20
	C. L. Newell & Co.	Oak										$ 8 25			8 25
	Ohio Belting Co.	Rubber valves										68 00			68 00
	People's Gas Co.	Gas				$35 30									35 30
	The Press	Advertising			$6 00										6 00
	A. G. Harbaugh	Carbon oil				6 63									6 63
	Rhodes Beidler & Co	Coal	4 00												4 00
	T. J. Saundercock	Mason work								19 50					19 50
	Sanford & Co.	Coal				48 15									48 15

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
November.	A.B.Schellentrager	Water meters						$27 00							$ 27 00
	Scott & Downer	Estimate												$4996 24	4,996 24
	J. J. Shepard	File								$ 9 50					9 50
	D. T. Slater	Cartage	$26 50												26 50
	Strong Cobb & Co	Carbon oil		$8 27											8 27
	W. P. Southworth	Pails		3 32											3 32
	Jno. Thompson	Steam fittings					$ 26 95								26 95
	M. Thomas	Coal	1 75												1 75
	Tod Stambaugh	Coal				$862 98									862 98
	Upson Walton & Co	Nails etc												1 84	1 84
	VanDorn fence w'k	Estimate								786 42					786 42
	Variety iron works	Boiler repairs					1017 84								1,017 84
	Ward & Jackson	Blacksmithing	6 08												6 08
	Warner & Swaysey	Rep'r counters					14 30								14 30

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
November.	J. T. Watterson	Labor etc.											$194 06		$194 06
	Windorf Uhl	Copper roof											126 00		126 00
	Wing & Pellet	Lime											4 50		4 50
	Wood Bros.	Sewer pipe											18 13		18 13
	R. D. Wood	Hydrant	$1,164 00												1,164 00
	H. R. Worthington	Meters						$465 50							465 50
	Woods, Perry & Co.	Lumber etc.											16 10		16 10
			217,955 54	$6792 53	20963 23	40423 23	$2656 92	$9372 50	$3334 53	$92,618 56	14995 11	10294 73	62482 87	37950 82	518,630 66
December.	McReynolds & Gawnes	Estimate								$20,000 00					$20,000 00
	Pay Rolls	Labor	$2,951 64	$339 63	$1885 56	$1732 49		$249 01	$170 50	212 50	$60 00	$180 00	$69 10		7,850 43
	A. Angstadt	Boiler work					$60 76								60 76
	Auld & Conger	Mantl's&grat's									23 50		23 50		47 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
December.	Barnes m'f'g Co.	Car movers				$ 9 00									$ 9 00
	W. Bingham & Co.	Packing etc.				20 59									20 59
	F. & H. Born	Globes		$10 80											10 80
	W. P. Braund	Blacksmithing	$0 60												60
	S. C. Brooks	Meter boxes						$21 25							21 25
	Chafer & Becker	Steam fittings										$325 50	$149 72		475 22
	Cleveland Gaslight & Coke Co.	Gas			$11 00										11 00
	Cleveland Steam Gauge Co.	Gauge										1 50			1 50
	Erie Telephone Co.	Tel. service			30 00	18 00									48 00
	Crosby Steam Gauge Co.	Glasses										4 80			4 80
	P. Desnoyers	Plumbing		3 03											3 03

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.—CONTINUED.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
December.	Farnan's brass wk's	Clamp & Stuffing box		$4 45		$ 2 25									$ 6 70
	W. H. Ford	Use of horse			$40 00			$ 6 00	$40 00						86 00
	Wm. Gaul	Hauling ashes				52 25									52 25
	City of Cleveland	Paving repairs	$640 40												640 40
	Gibson & Price	Pig Lead	240 49												240 49
	S. V. Harkness	2 WaterMeters						40 00							40 00
	Hugh Harrison	Hard brick											$60 00		60 00
	H. M. Hempy & Son	Wood plugs	3 70												3 70
	Kennedy, DeForest P & Co.	Lengthening Hydrant pipe	7 73												7 73
	W. G. LePelley	Carpenter w'k.					$5 50						8 25		13 75
	Mr. Law	Joiner work at Crib												$7 50	7 50

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885. CONTINUED.

1885.	To Whom Paid.	For.	Pipe Extension.	Hydrant Repairs.	Office and Inc. Expenses.	Engine House Expenses.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
January.	Lord, Bowler & Co.	Valves	$518 50							....	....	....	....	....	$518 50
	R. T. Lyon	Cement								....	....	....	$9 50	....	9 50
	J. Manning jr. & Co.	Blacksmithing	21 24	$6 70			$18 00	....	$3 00	....	....	....	....	....	48 94
	Ohio Belting & Supply Co.	Valve						....	....	....	....	$92 31	....	....	92 31
	A. T. Osborne & Co.	Paper			$11 25			....	....	....	....	....	....	....	11 25
	People's Gas Co.	Gas				$60 70				....	....	....	....	....	60 70
	Burtle & McNeal	Lumber	158 00			11 97		$18 00	....	$14 81	....	....	....	....	202 78
	Rhodes, Bolder Coal Co.	Coal	6 00	6 25				....	....	....	....	....	....	....	12 25
	J. J. Shepard	Fire clay					8 00		....	....	....	....	....	....	8 00
	Strong, Cobb & Co.	Lard oil					65	....	....	....	....	....	....	....	65
	R. T. Slater	Oakum	27 00					....	....	....	....	....	....	....	27 00
	J. Curlow	Paint'g pipe's					18 12	....	....	....	....	....	....	....	18 12

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1885.

1885	Bills Rendered by	For	Pipe Extension.	General Repairs.	Office and Gen. Expense.	Engine House Expense.	Engine House Repairs.	Meters.	Ferrules.	Fairmount Reservoir.	Kinsman Reservoir.	High Service Engine.	High Service Engine House.	Crib.	Total.
December.	A. T. VanTassell & Co.	Hardware				$22 31									$ 22 31
	Ward & Jackson	Blacksmithing	$ 5 20	$1 73										$0 50	7 43
	B. D. Wood & Co.	Fire hydrants	840 00												840 00
	Wood Bros.	Sewer pipe											$12 00		12 00
	Worswick Mfg. Co.	Plumb. fittings						$ 11 58							11 58
	H. R. Worthington	Water Meters						653 90							653 90
	Scott & Downer	Labor and Materials												2772 21	2,772 21
			223,377 00	$6164 12	22841 04	42352 69	$2708 21	10,572 36	$3548 33	112,845 37	14968 61	10498 84	62614 94	40731 03	553,642 54

RECAPITULATION.

Pipe Extension	$ 223,377 60
General Repairs	6,164 12
Office and General Expenses	22,841 04
Engine House Expenses	42,352 69
Engine House Repairs	2,768 21
Water Meters	10,372 36
Ferrules	3,548 33
Fairmount Reservoir	112,845 37
Kinsman Reservoir	14,968 61
High Service Engine	10,898 94
High Service Engine House	62,814 94
Crib	40,751 03
Total	$ 553,682 54

THIRTY-FIRST

ANNUAL REPORT

OF THE

Water Works Trustees

OF THE

CITY OF CLEVELAND,

FOR THE

YEAR ENDING DECEMBER 31, [illegible]

[illegible]

[illegible]

[illegible]

VWK 3

THIRTY-FIRST

ANNUAL REPORT

OF THE

Water Works Trustees

OF THE

CITY OF CLEVELAND.

FOR THE

YEAR ENDING DECEMBER 31ST, 1886.

CLEVELAND, O.:
PEERLESS PRINTING COMPANY.
1887.

TRUSTEES' REPORT.

To the Honorable City Council:

GENTLEMEN: The thirty-first annual report of the Trustees of Water Works together with the reports of the officers of the Board, are respectfully submitted.

The report of the Secretary gives in detail the business of the department for the year, an important feature of which is the gain in net receipts of $23,962 94.

The Board have ordered a reduction of 10 per cent., beginning April 1st, in meter rates to all consumers in the city, which reduction will amount in the aggregate to $15,000 per year.

It is the policy of the Board to lower the rates for water as often as circumstances will permit and to avoid if possible an increase in the bonded debt.

We desire to call your attention to the need of prompt action in pushing the building of another tunnel. It will be seen by the report of the Superintendent and Engineer that the quantity of water required at times very nearly approaches the limit of the capacity of the present one, and that by the time a new one can be completed its full capacity will have been reached.

The quantity of water that can be drawn through the proposed new tunnel daily, is one hundred and ten million gallons. This with the supply delivered by the old one, would be sufficient for the wants of a population of nearly one million.

The engines and boilers now under contract will supply the increase in the demands for water for a number of years to come, but additional main pipes will be needed to deliver it as the population in the outlying districts increases.

The reports submitted herewith are so full in detail that we deem it unnecessary to do more than ask of you a careful perusal of them.

You will find therein an estimate of the anticipated expenditures for the coming year. The estimate for pipe for distribution is based on the amount expended during last year, but the increase in the cost of iron and the probability of an increased demand for pipe may make the sum named for that purpose insufficient.

Wm. E. [illegible]
A. W. [illegible]
Geo. A. [illegible]
Trustees of Water Works.

Secretary's Report.

SECRETARY'S RPORT.

OFFICE OF THE SECRETARY OF WATER WORKS.
CLEVELAND, OHIO, Feb'y 8, 1887.

To the Honorable Board of Trustees of Water Works:

GENTLEMEN:—I have the honor to respectfully submit this, the Thirty-first annual report of the financial condition of this department for the year ending December 31, 1886.

GROSS RECEIPTS.

For Water measured	$146,607 06	
For water from regular assessments	198,516 15	
" " " miscellaneous sources	7,266 54	
For 2,064 connections @ $3	6,192 00	$358,581 76
For account of construction	7	
" " " pipe extension	6,375 94	
" " " water meters	98 94	
" general repairs	160 23	
" " " engine house expense	67 60	
" " " engine house repairs	31 89	
" " high service expence	49 30	$6,772 30
Cash in office Jan'y 1, 1886	1,281 24	
" " City Treasury Jan'y 1 1886	55,350 36	56,631 60
Total		421,986 36

DISBURSEMENTS.

Returned water rent	$ 1,579 23	
Ferrules & stopping 964 connections	3,810 68	$ 5,389 91
Office and general expenses	36,492 57	
General repairs	8,194 67	
Engine house expense	43,179 21	
Engine house repairs	3,014 35	
High service expense	5,054 96	95,935 76
Pipe extension	125,600 69	
Account of Fairmount Reservoir	37,340 36	
" " Kinsman "	15,466 94	
" " High service engine house	[illegible] 58	
" " [illegible]	[illegible]	
" " [illegible]	[illegible]	
" [illegible]	[illegible]	
" " [illegible]	[illegible]	[illegible]
[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]
[illegible]		421,946 36

From the foregoing statements of receipts and disbursements is obtained the following:

Received for water and new connections	358,581 76	
Less amount paid for returned water rent and tapping.	5,389 91	353,191 85
Cash Jan'y 1, 1886.		56,631 60
		$ 409,823 45
Paid for operating expenses and repairs.	85,616 76	
Paid for permanent improvements	202,606 99	
Cash Jan'y 1, 1887	121,599 70	409,823 45

The net earnings of 1886 were	$ 267,575 09
" " " " 1885 "	243,612 35
Increase	$ 23,962 94

The rates on water measured to consumers in the city have been reduced ten per cent. to take effect on bills coming due April 1st, 1887.

This reduction will amount to fifteen thousand dollars per annum. Taking this reduction into consideration, I would make the following estimates.

Gross receipts for 1887.	$ 360,000 00
Cash on hand	121,000 00
	481,000 00
Operating expenses.	85,000 00
Available for other purposes	396,000 00

This amount subject to the interest on the Water Works bonds outstanding, payable as follows:

May 1, 1887	$ 21,000 00	
July 1, 1887	2,000 00	
Sept 1, 1887	31,075 00	
Nov. 1, 1887	21,000 00	
Jan'y 1, 1887	2,000 00	
March 1, 1888	31,075 00	$108,150 00

Seventy-five thousand dollars of which has been, January 15th, 1887, paid to the Cleveland Sinking Fund Commissioners, as provided by ordinance, to be applied to the payment of the above amounts, as they become due.

There should be in the City Treasury Jan. 1, 1887, say thirty-five thousand dollars to pay the operating expenses of the department for the month of January, February and March. This will leave the sum or $253,000 that may be expended for enlargements during the year.

LEDGER BALANCES AT CLOSE OF BUSINESS DECEMBER 31, 1887.

Face of Ledger.		Debit	Face of Ledger.		Credit.
Cash..	$	1,812 68	Water rent.	$	2,286,310 45
City Treasurer.		119,787 02	City of Cleveland.		48,071 26
Interest & discount		140,800 64	Bonds outstanding.		1,775,000 00
Construction.		4,315,450 33	Bonds redeemed		925,000 00
Fairmount Reservoir.		391,290 27			
Knowles engines.		507 75			
Water meters		64,733 02			
		5,034,381 71	Total	$	5,034,381 71

THE BONDED DEBT IN DETAIL.

When due.	Amount	Rate of Interest.	Annual Int.	When due	Amount.
May 1, 1892	$ 400,000 00	7 per cent.	$ 28,000 00	Jan. 1.	$ 2,000 00
May 1, 1893	200,000 00	7 per cent.	14,000 00	Mch. 1.	31,075 00
Oct. 1, 1895	200,000 00	6 per cent.	12,000 00	May 1.	21,000 00
Sept. 1, 1897 .	500,000 00	6 per cent.	30,000 00	July 1	2,000 00
" " 1900	275,000 00	6 per cent	16,500 00	Sept. 1.	31,075 00
" " 1902	100,000 00	3 65-100 per cent	3,650 00	Nov. 1	21,000 00
" " 1912 .	100,000 00	4 per cent	4,000 00		
Totals....... ..	1,775,000 00		108,150 00		108,150 00

The construction account as shown in the Ledger, is made up of the following parts:

Franklin reservoir and grounds, six acres	$ 84,852 13
Engine house grounds, Old River street, four acres.. .	54,356 14
Two houses in which are four pumping engines, and boilers and room for two more, providing for a daily pumping capacity of 70,000,000 gal..	220,169 77
For compound duplex pumping engines, boilers, etc., daily pumping capacity of 40,000,000 gallons	278,309 20
Lake crib shafts, tunnel from crib to pump well, 1 m., 3,940 ft. long, 5 ft. 2 ins. in diameter, 40,000,000 gallons daily capacity . .	510,026 46
The pipe system, consisting of 24 miles main pipe, 205 miles distributing pipe. Total 229 miles; 2,292 fire hydrants	2,789,149 05
1,278 water meters set on service . .	64,731 02
Fairmount reservoir, 80,000,000 gallon capacity .	391,290 27
High service reservoir, 25,000,000 gallons capacity	143,906 96
High service engine house and cornish engines, pumping capacity 9,000,000 daily . .	201,759 11
	$4,771,473 02

The following table shows the receipts for water from the beginning of the works, also the operating expenses and repairs. The receipts less the expenses and repairs agrees with the water rent account as shown in the Ledger.

Years.	Receipts for Water.	Running Expenses.	Repairs.	Receipts Less Exp'ses & Rep'rs
1856 to 1866	234,218 21	108,592 75	20,362 60	105,257 86
1867	51,862 45	14,246 06	3,685 79	33,930 60
1868	57,297 98	17,304 32	3,653 43	36,340 23
1869	62,869 72	18,880 18	3,299 56	40,690 03
1870	70,411 18	19,725 24	9,823 99	40,861 95
1871	80,497 44	24,382 16	10,155 33	45,949 95
1872	90,243 96	26,651 65	6,953 49	56,638 82
1873	108,431 00	38,218 30	3,673 07	66,539 63
1874	116,433 08	48,951 79	9,515 99	57,965 30
1875	114,602 13	57,830 17	11,566 26	45,205 70
1876	140,935 87	51,481 59	15,966 86	73,487 42
1877	152,794 68	50,571 46	20,673 36	81,549 86
1878	160,125 70	47,183 44	22,453 91	90,488 35
1879	182,173 33	44,616 59	11,182 61	126,374 13
1880	202,371 92	47,618 76	8,296 13	146,463 03
1881	233,981 71	56,430 19	8,586 07	168,965 45
1882	248,879 06	57,857 47	7,835 56	183,186 03
1883	274,614 15	61,617 58	11,593 24	201,403 33
1884	296,392 60	66,196 11	9,470 48	220,725 71
1885	317,661 06	65,150 73	55,498 35	197,011 98
1886	353,191 85	77,582 32	8,034 44	267,575 09
Total	$3,549,980 08	1,001,389 11	262,280 52	2,286,310 45

The following statement shows in detail the receipts for the year from other sources than that of water.

Jan.	American Lubricating Oil Co., for pipe laid and connection.	$413 58	
	Cleveland Hardware Co., for two in. connections in Lake St.	17 44	
	City of Cleveland, for pipe at Kingsbury bridge....	24 00	
	E. McCue, for old cement pipe	17 00	
	J. B. Smith, for enlarging two connections Meadow street.	13 40	
			$ 485 42
Feb.	Smith & Connors, valve-box and pipe..	5 61	
	Cash, old oil barrels	21 60	
	Theodore Kuntz, enlarging fire connection	72 27	
	Union Rolling Mills, four in. connection at mills.. . . .	172 02	
			271 50
Mar.	Thomas Larler, elevator connection	52 46	
	Cleveland Paper Co., connection in Forest street . .	214 95	
	O. G. King, connection to Benedict block	78 94	
	Brooks Oil Co., three in. connection in Bessemer	87 85	
			434 20
Apr.	A. Hughes, four in. elevator connection.... . .	73 94	
	A. F. & H. Strater, enlarging connection of Root & McBride.	32 70	
			106 64
May.	A. D. Wade, rent of house High Service Reservoir	29 30	
	National Refining Co., connection in Bessemer	133 01	
	M. Goreuch, 30 old water lime barrels .	3 00	
	Howell Tool Co., three in. connection in Elm	84 10	
	Cleveland Rubber Works, one meter counter	3 00	
			252 41

June	Chas. Rees, 135 pounds scrap iron	[illegible] 32	
	E. Dart, for material sold	[illegible] 0	
	E. Dart, for old barrels	[illegible] 0	
	H. P. Mathews, agt., for rent of [illegible]	50 00	
	Sewerage [illegible] M[illegible] [illegible] service	12 50	
	Dennison & [illegible]	50	
	Standard [illegible] repairing meter	[illegible]	
			64 [illegible]
[illegible]	T. E. W[illegible] Lewis Ave.	1[illegible] 0	
	[illegible] A. [illegible]	[illegible] 0	
	Sewerage [illegible] connection [illegible]	[illegible]	
			165 [illegible]
[illegible]	Village [illegible] Brookl[illegible] setting meter	[illegible] 0	
	[illegible] Russel[illegible] same	[illegible]	
	Lake Shore [illegible] connection	[illegible]	
	Sewerage [illegible] connection [illegible]	[illegible]	
	Hawes House [illegible] elevator	[illegible] 4	
	[illegible] House	[illegible]	
	[illegible]	4 [illegible]	
			[illegible]
[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
			4[illegible]
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
			[illegible]

Nov.	A. G. Colwell, connection in Ontario	92 60	
	M. Halle, two connections Sheriff	154 48	
	John J. Graves, repairing pipe	10 00	
	Cleveland Burial Case Co., changing fire plug	10 88	
	" " " enlarging connection	14 99	
	" " " two in. fire connection	16 99	
	R. Doty, 4815 pounds of scrap	28 89	
			328 81
Dec	George Muth, for earth from pipe trench	18 00	
	George S. Paine, twelve days' labor	18 00	
	J. J. Flick, 117 loads of stone	29 25	
	Lake Shore Foundry, connection on Lake street	45 80	
	A. J. Aiken, rent of house, Norman	20 00	
	Cleveland Hardware Co., fire connection	151 61	
	O. Macomber, 100 old cement barrels	8 00	
	Chas. Lederer & Son, four in. connection in Ontario	82 94	
	American Wire Co., four in. connection in Lake	219 25	
	Cleveland Paper Co., fire connection in Broadway	210 06	
	Standard Oil Co., one two in. water meter	53 53	
	Herig Bros., four in. connection to pipe in Woodland	54 41	
	Excelsior Oil Works, four in. connection in Atlantic St	43 15	
			954 00
	Total		$ 6,772 90

A new assessment of the premises supplied with lake water was commenced last May. Two men are engaged at that work, they find houses that have been enlarged, houses that were built on rear of lots, baths and water closets that have been put in that plumbers have failed to report in a great many instances. They have found also a great deal of poor plumbing, which has been inspected by the plumber employed by the department, whose duty it is to see that defects are remedied. The result of the work is highly satisfactory; about one-third of the city has been resurveyed. As ordered by you last May, any person making application, claiming to be a plumber, on filing the usual bond approved by the Honorable City Solicitor, has been granted permits to do plumbing work.

An examining board consisting of the Health Officer, Engineer of the Water Works and City Engineer, had been appointed, to whom these applications were to be referred. This committee never has held a meeting, consequently, no examination of the applicants has been made.

I would respectfully call your attention to this question with the suggestion that prior to the annual renewal of plumbers' licenses in May, steps be taken to put the matter upon a better foundation.

All of which is respectfully submitted.

WILLIAM A. MADISON, *Sec'y.*

SCHEDULE,

Showing the gallons of water pumped and coal consumed in pumping, percentage of coal consumed and water pumped by each engine; contract price of coal and cost of coal for raising 1,000,000 gallons into reservoir.

Engine.	No	Water pumped by the different Engines.	Pounds of coal consumed by the different Engines.	Per cent. of Water pumped by the different Engines.	Per cent. of coal consumed by the different Engines.	Per cent. of coal consumed by different Engines pumping 1,000,000 Gallons into Reservoir.	Contract price of coal.	Cost of coal for pumping 1,000,000 Gallons into the Reservoir.	Year.
Worthington.	1	1,473,630,360	4,844,800	20.67	21.55	23.51	1 50	2 46	1896
Worthington.	2	2,647,952,420	8,119,150	37.14	36.13	21.93	1 50	2 30	1896
Worthington.	3	2,937,227,060	9,197,000	41.21	40.92	22.40	1 50	2 35	1896
Henderson.	1	69,463,625	314,130	.98	1.40	32.16	1 50	3 37	1896

Report of Superintendent.

REPORT OF

SUPERINTENDENT AND ENGINEER.

To the Board of Trustees of Water Works:—

GENTLEMEN:—Herewith is presented the Thirty-first Annual Report of the Superintendent and Engineer of Water Works.

LAKE CRIB.

Since the rebuilding of the superstructure of this important part of the water supply system no repairs have been necessary. During stormy weather it was found that water was forced into the dwelling rooms at the junction of the upright with the horizontal timbers, the floors in the rooms were raised and the annoyance to the keeper and his family abated.

The Fresnal light of the sixth order, removed when the crib was damaged in 1878, has been replaced.

An attempt was made during the summer to open the middle inlet from the outer wall to the shaft wall, but it was found to be so much under the clay in the wall that, for the time, the work was abandoned, it was also found that to do the work at a reasonable cost a scoopdredge and hoisting machinery would be necessary.

An upright boiler of about eight horse power has been placed in tower room over the shaft, fitted with pipe for conveying steam to the inlet and shaft in case either of them become obstructed with ice.

TUNNEL.

There has been no interruption to the flow of the water through the tunnel since my last annual report, and it is not believed that the water supply can be cut off again from the same cause, with the provision now on the crib for removing ice. At no time since the beginning of cold weather has there been less than thirty hours supply of water stored in the Fairmount reservoir. With that quantity of water in the reservoir and the means at hand for quickly removing ice from the inlet, the danger of another water famine, from that cause, is very remote.

During the summer an examination of the inlet of the old aqueduct was made and it was found that, since the building of the break water, the shore line has been extended outward, by sand deposits, until the inlet is now just at the water line. The Waverly avenue main sewer, that takes the drainage of all the northern and western portion of the west side has its outlet directly at this inlet, and water that could be obtained would be of the foulest and disease breeding character; for that reason, and by the advice of the health office nothing was done to open the aqueduct.

BUILDINGS.

No repairs have been necessary to either of the buildings. When the new engines are placed in the north building it will be necessary to fit up the room to correspond, as near as may be, with the finish of the engines. At the same time, I would advise that new doors, windows and frames be placed in the main engine room, and that the whole of the engine building be painted.

MACHINERY AND BOILERS.

From the report of Mr. D[illegible]y, chief engineer of the pumping works, it will be seen that all the engines and boilers are in good working order, but that No. 1 Worthington engine, which has been in almost constant service since 1876, and is now pumping against a maximum pressure eighteen pounds per square inch greater than it was built for, will need two new high pressure cylinders as soon as the new engines are ready for service. This engine was broken in 1883 and was repaired temporarily, and has been in service to this time without showing signs of further weakness, although a feeling of insecurity must exist until the fractured parts are renewed.

I concur in the recommendation of Mr. Doty regarding the removal of the Henderson engines and replacing them with others of better design and greater economy in the use of steam.

It is expected that one of the Knowles' engines will be ready for service some time in July next.

FRANKLIN STREET RESERVOIR.

This reservoir remains in the same condition as at the date of my last report, it has been kept full of water thoughout the year but has not been used.

It would seem advisable, now, that it is no longer of any use as a storage place for water, that some disposition should be made of it that will relieve this department of the expense of its care. It is now used as a storage place for pipe and scrap iron. No repairs have been made upon it, but to protect it from injury, it has been necessary to keep a watchman, at an expense that might be saved if it could be disposed of. As a storage place for materials it is a great convenience, but a lot of small value would answer the same purpose.

FAIRMOUNT RESERVOIR.

Water has been kept in this reservoir continuously since the first of December, 1885, with the exception of two days in January last when the tunnel inlet was stopped with ice. The south basin has been filled from a depth of 16 ft. to the over-flow line during all the latter part of the year. The contractors have not yet completed the repairs in the north basin, they have found and repaired the larger leaks, but on account of snow and ice have not restored the pavement. The worst leaks, and the ones that would seem to be the least excusable, were holes made by stakes, used by the pavers to hold to their lines, the others were caused by layers or pockets of sand or ballast intervening between the layers of clay.

The leaks were difficult to find, but when found, easily and quickly repaired. The iron fencing and railing is completed with the exception of a few sections of the hand-rail on the front stairs.

I would again advise the flagging of the side walks in front of the reservoir and engine house on Woodland Hills avenue.

HIGH SERVICE RESERVOIR.

This reservoir has been filled to a depth of from twelve to eighteen feet all the year. The settlement of the embankments as mentioned in my last annual report, had caused the pavement in places to be thrown out of line, and during the summer the keeper and two laborers were at times engaged in [illegible] these places and restoring the pavement to line. [illegible] the same [illegible] railing has been built along the outer margin of the gravel walk on the four sides [illegible] posts have been set [illegible] the inner line of [illegible] of the embankment.

[illegible] was directed by [illegible] them by [illegible] off the water [illegible] built for the [illegible] the basin. I objected on the ground that it would not be safe to do it in so short a time, but the committee assuming all responsibility for any damage, I obeyed their instructions and had the gate in the 20 inch waste pipe and one in a 12 inch pipe connecting with Fairmount reservoir opened at 2 o'clock P. M. of the same day; at this time the depth of water was about 18 feet. By 3 o'clock P. M. on the 9th the water had fallen to 8 feet and a personal examination of the banks and pavements showed them to be in good condition with no signs of disturbance. At 10 o'clock, the same evening, Mr. Wade the keeper again visited the top of the banks and found them still in a sound condition, with the pavement undisturbed. At 5 o'clock on the morning of the 10th, Mr. Wade went to the top of the banks and found that the water had fallen to 5 feet and that the pavement on the south and east slopes had commenced to slide, under the heavy load of ice that lay on the slopes, and that for a distance of about 200 feet on each of these sides the stone was badly out of place. By 10 o'clock the same day a part of the stone near the center of the north bank had commenced to move. The water gates were then closed and after an examination by the committee the pumps were started and the basin filled to a depth of 8 feet, at about which depth it has been kept since the unfortunate occurrence. The committee reported in substance, that while a few of the stone were broken and should not have been used, the pavement as a whole was suitable for the purpose for which it was laid. No further movement of the banks or pavement has taken place up to this date. Nothing can be done towards restoring the pavement until the frost is all out. To replace the pavement would probably cost not far from $2,000, but I would advise that the pavement and ballast be all removed and the clay repuddled to a depth of not less than two feet, the estimated cost of this work is $7,000. It will not be necessary to deprive any part of the city of its water supply while the

work is being done as has been falsely and maliciously stated.

MAIN PIPE.

During the year 3,793 feet 30 inch main pipe was laid in Burton street, from Lorain street south to Clark avenue, and 10 feet of 20 inch was laid in Doan at Quincy street.

I would again recommend the extension of the 30 inch main in Clark avenue, from Burton street easterly to Jennings avenue a distance of 6000 feet. I would also recommend that a 20 inch main be laid in Doan street, from Quincy street north to Euclid avenue, as a feeder for the pipes in the eastern extremity of the city; the length would be about 3,650 feet. Plans and specifications have been prepared for a 36 inch wrought iron pipe, to be laid across the river at Ohio street, and proposals for the work may be called for at any time.

DISTRIBUTING PIPE.

The length of distributing pipe laid during the year was 15 miles; 5,274 feet; of this quantity 13 miles, 4,369 feet was laid in the low service district, and 2 miles, 905 feet in the high service: 3 miles, 925 feet of pipe was lowered.

The total length of pipe of all sizes in use at this date is as follows:

Main pipe in low service system	18	miles	4032 feet.
" " " high " "	5	"	2170 "
Distributing pipe in low service system.....	199	"	730 "
" " " high " "	5	"	4633 "
Total.......	229	miles	5 feet

STOP GATES.

The number of stop gates set in pipe lines and fire hydrant branches during the past year was 445, of this number 45 were set to take the place of others removed for repairs, or where pipe was relaid, making the number added 400. The total number now in use is 4,447 of these 140 are in main pipe lines above 12 inches in diameter.

FIRE HYDRANTS.

The total number of fire hydrants now in use is 2,202, of these 217 were added during the past year. The number in the low service dist. is 2,111, and in high service dist. 91.

SERVICE PIPE.

The increase in the number of service connections in use over the year 1885 was 1,984.

CONNECTIONS.

Size.	Made Previous to 1886. After Revision.	Made in 1886.	Total.
½ inch	....	114	114
5-8 "	18,894	1864	20,758
¾ "	624	29	653
1 "	79	2	81
1¼ "	27	3	30
1½ "	36	2	38
2 "	178	8	186
2½ "	3	0	3
3 "	83	2	85
4 "	122	15	137
6 "	5	0	5
Totals	20,051	2,039	22,090

Turned off for non-payment of rent or other causes	687
Not extended beyond curb line..........	1048
Abandoned and plugged............	10
Not in use	1695
In use December 31, 1886	20395

WATER METERS.

During the year 180 meters and 10 hydraulic elevators with registers were added, making the total number of devices for measuring water 1,365 as follows: Meters 1,278 elevators 82, water motors 5.

METERS IN USE DECEMBER 31st, 1886.

Name of Meters.	⅝ In.	1 In.	½ In.	2 In.	3 In.	4 In.	Total
Worthington piston	664	309	114	104	54	29	1274
Crown rotary	....	2	....	....	....	....	2
Ballard Fitts rotary	1		....		1	....	2
Totals	665	311	114	104	55	29	1278

Total number of meters in use	1278
" " " elevators in use	82
" " " water motors in use	5
Total devices for measuring water	1365

There was measured by water meters, hydraulic elevator registers, and water motors 1,495,316,141 gallons of water, equal to 4,096,756 gallons per day, being an increase of 700,063 gallons per day, and 255,522,971 for the year over 1885.

DISTRIBUTION.

The total quantity of water pumped as registered by the different engines during the year was 7,128,673,365 gallons, an increase of 576,679,178 over the previous year.

The average daily supply was 19,530,612 gallons. The rate of increase was 8 8-10 per cent. The cost of pumping each million gallons, 100 feet high, at the main pumping station, was $3.50, or 76 cents less than for the year 1885.

WASTE OF WATER.

Your attention is called to an abuse in the use of water that, if not corrected, will in time cause a serious loss in revenue to the city. I allude to the practice of placing yard hydrants over slop sinks connecting with sewers that pass through privy vaults; hundreds of these are being put in each year and the rates for water-closets thus avoided. The common practice is to allow the water to run continuously under a mistaken notion that any person having paid water rent may allow his fixtures to discharge all the water that can pass through them during the year. As these devices are not attached directly to the water pipes there is no charge for them, and the loss in revenue is already very great, millons of gallons being taken every year for which the city receives no pay. I would therefore suggest that, some rule be adopted by which reasonable revenue may be derived for the water thus used.

ESTIMATED EXPENDITURES.

The anticipated expenditures for the year may be approximately stated as follows:

Two fifteen million gallons pumping engines	$ 79,000
Preparing foundations for same	5,000
Suction and discharge pipes for same	5,000
Six boilers set @ $ 3,333⅓	20,000
6,000 feet of 30 inch main pipe @ $7	42,000
Fairmount Reservoir final payment	9,000
Repairing High Service Reservoir	7,000
Operating expenses and ordinary repairs	80,000
Pipe extension for distribution	130,00
Total	$ 377,000
Cash in Treasury and estimated income	416,000
Balance	377,000

Any work that may be done on the new tunnel must be paid for from the proceeds of the sale of bonds.

I submit herewith a special report upon the enlargement and extension of different parts of the works, as directed by a resolution adopted by your Board in July last.

Respectfully submitted,

JOHN WHITELAW, *Supt. & Engineer.*

CLEVELAND, Jan. 28, 1887.

To the Board of Trustees of the Water Works:

GENTLEMEN:—The resolution of your Board, adopted July 17th last, directing me to present to you, as soon as practicable an estimate of the probable cost of the following additions to the Water works system, to wit: A tunnel from the lake crib to pumping houses, with connections to pump wells, a pumping engine of sufficient pumping capacity and a line or lines of main pipe from the pumping houses, by the most available routes to the localities to be benefited by such improvement. Also that I be requested to state in such report, my opinion as to the necessity for an immediate beginning of such work, has been duly considered and such general plans have been made as will enable me to prepare an approximate estimate of the cost of the work contemplated. The tunnel proposed under this resolution would be circular, seven feet by seven feet two inches in diameter, and would run in a straight line from a shaft placed in one of the compartments in the easterly side of the lake crib, to a working shaft near the south west corner of the north pumping house, a distance of about eight thousand eight hundred feet, from this shaft a branch tunnel would be built across the front of the north pumping house lot with pump wells reaching to the surface from which to take the water for the two fifteen million gallon pumping engines, to be placed in the north building, this to branch would terminate in a shaft from which future extension may be made to the eastward. From the working shaft another branch tunnel would extend southerly, also terminating in a shaft to a point opposite the southerly end of the present aqueduct; at this shaft connection would be made with the aqueduct leading to the pump wells in the south building, and thereby with the present tunnel.

To hasten the work of building the tunnel, it is proposed to sink another working shaft on the lake shore, from which work may be carried on in two directions at the same time. Such a tunnel would, with a head of thirteen and a-half feet, or with the foot valves in the suction pipes of the pumps submerged thirteen and a-half feet below the surface level of the lake, deliver one hundred and twenty-nine million gallons in twenty-four hours. Making due allowance for the ordinary fluctuations of the surface of the water in the lake, and the interruption to the flow by the angles at the shaft and the unevenness of brick surfaces the minimum delivery may be placed at one hundred and ten millions. The combined capacity of the old and new tunnels would then be one hundred and fifty million gallons in twenty-four hours, or one hundred and fifty gallons per capita per day for a population of one million.

While it is probable that the clay forming the bottom of the lake in front of the city, is of a nearly uniform character, it is possible that it may differ from that in which the present tunnel is built to an extent to make the work difficult if not hazardous on any particular line that may be chosen, and that all uncertainty may be removed so far as tests of the clay can do so, borings should be made at distances not over five hundred feet apart along the line.

It has been suggested, by persons evidently not familiar with the lake and its currents, that the next tunnel should be built opposite the easten part of the city and that new pumping works should be built at or near Willson avenue. In answer to such suggestion it may be said: First, that

the natural current of the lake is to the eastward and the water from the river joining that in the lake flows in the same direction and is diffused through the lake water for a distance of several miles from shore. Second, that the lake to the eastward is naturally the dumping place for the garbage, night soil and filthy mass of decaying organic matter annually dredged from the bottom of the river. Third, all of the sewers on the east side not discharging into the river have their outlets in the lake at different points from the mouth of the river eastward to Willson avenue. Another class of persons assert that the proper place to take the water from is opposite West Cleveland. To that plan the objection is offered that the bottom of the lake, only a short distance west of the present tunnel is shale rock, full of fissures and water and gas bearing seams, and therefore impossible to drive a tunnel in, except at great cost and constant danger to the lives of workmen. All the difficulties encountered in building the present tunnels were due to its nearness to the rock beneath it.

The discharge from Rocky river, carrying with it water from the Cuyahoga passing to the west in the shore eddy, flows north of the crib at distance varying from half a mile to one and a-half miles. To avoid this it would be necessary to place the inlet at least three miles from shore and, even at that distance clear water would not at all times be furnished. The present pumping capacity af the Water Works is 40 million gallons in 24 hours, divided as follows, namely: two pumping engines of 10 million gallons capacity each in the south building, and two of the same capacity each in the north building. In the latter building, the room in which the Cornish engines formerly stood, is 43x52 ft. and can accomodate two pumping engines of 15 million gallons daily capacity each, while the vacant space in the boiler room will contain six large boiler, these with the six now in the building would furnish steam for the four engines, including the two new ones, having a combined daily capacity of 50 million gallons. The contract for the pumping engines having been let, the reasons for advising the purchase of two at the same time may be briefly stated as follows, namely: First, because the rate of annual increase in the consumption of water, prior to 1886 and before the introduction of lake water into the high service district, averaged for a term of years, about 13 per cent., which rate will be materially increased since water can now be furnished to all elevations in the city. The average daily consumption for the year 1885 was about 18 million gallons, and if 14 per cent. be assumed as the annual rate of increase for the next six years the average daily consumption for the year 1892 will be 45 million gallons, to this must be added the increased demand during the mid-summer and mid-winter months, which at times reaches 50 per cent. in excess of the average for the year, the maximum demand would then be 67½ million gallons per day. Second, that both engines may be of the same kind and be so placed that one engine runner may attend to both and that, being alike, their action on the suction and delivery mains, common to both, for the time being, may be harmoious; and lastly, that there may be uniformity of appearance in the engine room.

The 30 inch main pipe running from the north engine house through Taylor, Franklin, Harbor, Randall and Burton streets to Clark avenue, should be extended easterly through Clark avenue, Vivian, Rocket and McBride streets to Willson avenue, thence northerly to Scovill avenue, where it would connect with a main of the same size. This pipe would pass through a portion of the city now destitute of feeding mains and would add another feeder to the main leading to Fairmount reservoir.

There are now in use one 24 inch and three 30 inch pumping mains, including the one now completed to the intersection of Burton street and Clark avenue, leading to the central and eastern parts of the city. These have a delivering capacity, without excessive friction, of about 44 million gallons in 24 hours. When the laying of the 30 inch main is completed a 36 inch should be commenced, extending from the pumping works easterly through Washington street to the river opposite St. Clair street, thence under the river and along St. Clair street to Erie, through Erie to Superior, through Superior to Payne avenue, through Payne avenue to Willson avenue and south in Willson to Hough, thence easterly in Hough with a 24 inch to the Crawford road, thence through Hough, Ansel and Doan to Quincy street with a 20 inch, where connection would be made with the main leading to Fairmount reservoir. Branch pipes should be placed in this main at all the leading avenues, from which submains may be laid for local distribution.

This pipe line need not be completed at once but should be commenced and continued from year to year until the circuit is completed or as local demand may require. As the cost of pipe and labor may change very materially before this pipe is laid I have not made an estimate of its cost.

Work may be carried on at both ends of either of these lines, at the same time, if necessary.

The most important of these improvements, and the one that should receive earliest attention, now that the contract for the pumping engines has been let, is the tunnel. I have expressed my own views regarding the proposition to build a tunnel to a new inlet, either east or west of the present one, and would be pleased to have the subject further considered by experts, believing that when the facts are fully understood the objections offered to each of the plans will be sustained. The distance from the shore at which the inlet shall be placed is more a question of cost than engineering as extensions from the present one may be made at any time in the future.

The work should be prosecuted in the following order namely: First the pumping engines and boilers; second the tunnel and 30 inch main, crossing the city at Clark avenue; third, the 36 inch main across the northerly part of the city. The time required for building the tunnel, if no extraordinary difficulties are encountered, would be about two years, and the 30 inch main could be completed during the same time.

The estimated cost of the works as contemplated by the resolutions is as follows:

Tunnel 84 by 86 inches diameter, 9,800 feet, including branches and 7 shafts.	$ 270,000
Two 15 million gallon pumping engines in place, with foundations, suction and discharge main connections	97,600
Six tubular boilers with fittings in place	30,000
Main pipe 30 in diameter, 24,280 feet long	194,240
Total estimated cost	$ 581,840

Respectfully submitted,

JOHN WHITELAW, *Supt. & Engineer.*

CLEVELAND, January 18, 1887.

RECAPAPITULATION OF EXPENDITURES FOR THE YEAR 1886.

Pipe extension	**$ 129,600 69**
General repairs	**8,194 67**
Office and general expenses	**26,482 57**
Engine house expenses	**43,179 21**
" " Repairs	**2,014 25**
High service...	**5,054 98**
Ferrules	**3,810 68**
Meters	**12,016 81**
Fairmount Reservoir	**37,340 36**
High service engine house	11,810 68
High service engine	2,113 69
Kinsman Reservoir	15,496 94
New Engine	506 75
Crib	213 95
Total	$ 298,807 33

Engineer's Report.

REPORT OF
ENGINEER IN CHARGE.

To the Superintendent and Engineer of Water Works:

SIR:—The report of the Engineer of the pumping Works is herewith respectfully submitted.

CORNISH ENGINES.

At the date of my last report the contract for erecting the Cornish engines at the high service pumping station was so far completed that the west engine had been tested with satisfactory results, and was ready for service. The east engines, however, was not ready for trial until January 29th, at which time it was started and found to work in a satisfactory manner. They were afterwards coupled together, tested and the final trial made March 19th, when they were found to work with entire satisfaction. These engines are now in first-class order.

On Nov. 1st an accident occured to the steam pipe of the engine, owing to an oversight in not allowing for expansion and contraction.

HENDERSON ENGINES.

July 26th, while these engines were in operation a fracture occurred in the back end of the right hand pump lower valve chamber. This being the third accident of the same kind at different times and places in these pumps warrants the conclusion that there is an inherent weakness caused by faulty construction and improper distribution of metal. As in former instances a heavy wrought iron band was shrunk on and tie bolts applied; these repairs as in former cases have strengthened the cylinders so that they are in as good condition as they can be under the circumstances. No considerable expense has been necessary save that incurred in making the above repairs and, as will be seen by the accompanying tables, they have done but little work. The time has arrived when these engines should give place to others of better design and greater economy. The great amount of steam they use makes the boiler capacity in the north building insufficient when it becomes necessary to run both sets of engines at the same time.

WORTHINGTON ENGINE No. 1.

This engine, erected in 1876, was designed to work against a pressure of about 62 pounds per square inch, and as you are aware, met the requirements of that service satisfactorily, but since the pressure has been increased to a maximum of 85 pounds per square inch some weak points have shown themselves. When these weak places were discovered it was thought best, to guard against breakage, to replace weak parts with better material and larger pieces. Steel plunger rods, with enlarged ends, took the place of the defective ones and heavy socket castings were introduced in the place of the lighter ones furnished with the engines.

The new steel rods proved worthless notwithstanding the fact that the material was represented to be the best made. They have since been replaced by others of refined hammered iron and thus far have proved satisfactory. When the new pumping engines now under contract are ready for service No. 1 Worthington engine must be thoroughly overhauled. Among other things they should have two new high pressure cylinders and I would recomend that they be ordered in advance, that, when the engines are dismantled, the least possible time may be consumed in making the repairs. The engines are now in good working order.

WORTHINGTON ENGINE No. 2.

This engine like No. 1 was designed for pumping against a head only 160 feet and has shown weakness in the same parts. On Dec. 29th the socket casting on the left hand pump plunger broke at the key way. A careful examination of all the parts revealed no further damage, a new and heavier casting was made and put in place and the engine is now in good working order.

WORTHINGTON ENGINE No. 3.

This is the last engine purchased and was built to pump against a head of 200 feet. It has been in constant service since Aug. 1884, and has ample strength for the work required. No repairs have ever been needed on it.

BOILERS.

Two of the marine boilers have received extensive repairs since my last report and at this time all the the boilers are in good repair. The last ten boilers put in at the West side works are of the marine type and are superior steam generators, but the large cost for repairs makes them objectionable as compared with tubular boilers. I have therefore recommended the adoption of the latter type, and plans and specifications have been prepared for six, each 8 by 16 feet, to be used in connection with the new engines.

CONTEMPLATED IMPROVEMENTS.

The contract for the two 15 million gallon pumping engines, to be placed in the north building having been let, and plans and specifications for the boilers to be used with them having been completed and proposals called for, I would suggest that I be directed to visit the works of the engine builders, after the detail plans are finished and before the patterns are completed, in order to examine the proportions and if necessary make such suggestions as my experience with this type of pumping engines may seem best. I ask this in the interest of the city and at the desire of the builders who have expressed a wish to do anything within the limits of their contract to make the engines meet all the requirements of the best of their type.

Allow me to express to you and through you to the Trustees my gratitude for so generously allowing me a vacation of three and a half months, to recuperate my somewhat impaired health during the winter and spring of 1886. I shall try and give these expression of gratitude a more practical manifestation by increased diligence in the performance of duty.

Respectfully submitted,

R. DOTY, *Engineer in charge.*

January 24, 1887.

LOW SERVICE DISTRICT.

SCHEDULE, SHOWING THE EXTENSION OF WATER PIPE IN 1886.

Side.	Size.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
West.	30 in.	Burton.	37 feet S. of Lorain street, to 30 feet T. in Clark avenue	3773		
North	30 in.	Clark	17 feet E. of W. L. of Clark avenue east	20	3793	
East.	20 in.	Doan.	15 feet N. of Quincy street north	10	10	
East.	12 in.	Burton.	10 in. pipe in Clark avenue north	64		6 in. to 12 in. relaid.
"	12 in.	"	" " " " " " south	87		
"	12 in.	"	24 feet N. of Clark avenue connecting 30 in. and 6 in pipe in Burton street	15		
"	12 in.	"	At Bailey street connecting 30 in and 6 in. pipe in Burton street	13	179	
West.	10 in.	Doan	3 ft. S. of N. L. Quincy street, to pipe in Cedar avenue	2083		
"	10 in.	"	21 ft. N. of Quincy street connecting 20 in. and 10 in. pipe in Doan street	16		
North	10 in	Euclid	E. L. Adelbert street, to 130 ft. E. of O'Connor street	2321	4420	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size.	Streets.	Between What Points.	Ft. Laid	Total.	Remarks.
East..	8 in.	Ansel	100 ft. S. of Hough Ave. north	368		
West...	8 in.	Bank	2 ft S. of Lake St. to 2 ft. N. of Lake street	108		4 in. to 8 relaid.
East....	8 in.	Belden	Pipe in Hamilton St. north	51		
"	8 in.	"	Pipe in St. Clair St 11 ft N. of St. Clair street	71		
" ..	8 in.	Case	Pipe in St. Clair St. to N. L. of St. Clair St	58		6 in. to 8 relaid.
South..	8 in.	Cedar	Pipe in Brenton St. to pipe in Giddings avenue	367		
" ..	8 in.	"	Pipe in Burt St. to pipe in S. Bell Ave	655		
" ..	8 in.	"	58 ft. E. of Watkins St. to 114 ft. W. of Altoona St	1059		
" ..	8 in.	"	Pipe in Doan St. to 12 ft. E. of Doan St	39		
East...	8 in.	Coe	Pipe in St. Clair St. to N. L. St. Clair St	62		
" ..	8 in.	E. Madison	Pipe in Superior St. to N. L. Decker Ave	744		
" ..	8 in.	E. Madison	N. L. Grand Ave. to 22 ft. S. of Rawlings Ave	392		
South..	8 in.	E. Prospect	248 ft. E. of Schiely Court East	181		
" ..	8 in.	" "	Pipe in Bolton Ave. west	854		
West...	8 in.	Fairmount	17 ft S. of Euclid Ave. to pipe in Highland street	1036		
East....	8 in.	Genesse	665 ft. N. of Crawford St. north	400		
North.	8 in.	Huron	Pipe in Sheriff St. to E. L. Sheriff St	44		4 in. to 8 in.
East....	8 in.	Kirtland	Pipe in St. Clair St. to 8 ft. N. of St. Clair St	69		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
South..	8 in.	Lake	Pipe in Water St. to 8 ft. E. of Ontario St	1748		4 in. to 8 relaid
" ...	8 in.	Lake	24 ft. W. of Marquette St. West	636		
East ...	8 in.	Marquette	Pipe in St. Clair St. to 10 ft. S. of St. Clair St	48		4 in. to 8 relaid.
West...	8 in.	Ontario	Pipe in Lake St. to 7 ft. N. of Lake St	65		
South ..	8 in.	St. Clair	Pipe in Case Ave to E. L. McHenry St	740		6 to 8 in. relaid. 4 in. abandoned & taken out & 8 in. relaid.
" ..	8 in.	" "	E. Line McHenry St. to 85 ft. W. of Asylum St	1356		
" ..	8 in.	" "	85 ft. W. of Asylum St. to pipe in Marquette St	1658		
East....	8 in.	Seneca	2 ft. S. of Lake street to 2 ft. N. of Lake St	104		4 in. to 8 relaid.
" ..	8 in.	Sheriff	Pipe in Prospect St., to pipe in Huron St.	491		
" ..	8 in.	"	Pipe in Huron St. to pipe in Bolivar St	487		4 in. to 8 relaid.
North..	8 in.	S. Woodland	Pipe in Ellsworth St., to cross in Tennyson St	302		
" ..	8 in.	Stanard	Pipe in Willson Ave. west	18		
South ..	8 in.	Superior	Pipe in Giddings Ave. to pipe in E. Madison Ave	448		6 in. abandoned & 8 relaid.
North..	8 in.	Woodland	S. L. Eagle St. to pipe in Ohio St	619	15218	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
East	6 in.	Aaron	Pipe in St. Clair St., to S. L. St. Clair St	42		4 to 6 in. relaid.
West	6 in	Abram	Pipe in Branch avenue south	288		
South	6 in.	Astor	441 ft. E. of Dunham avenue, to Giddings avenue	843		
East	6 in.	Asylum	Pipe in St. Clair St., to S. L. St. Clair St	38		
North	6 in.	Baily	Pipe in Mechanic street, to pipe in Freas avenue	210		
East	6 in.	Ballon	Pipe in Vivian street, to N. L. Barkwell street	543		
North	6 in.	Beaver	Pipe in Wilcutt street, to T. in Nicola street	248		
East	6 in.	Beech	7 ft. S. of Garden, to N. L. Scovill avenue	1377		
South	6 in	Beecher	Pipe in Giddings avenue, to 522 ft. W. of Russell avenue	1003		
East	6 in.	Belden	Pipe in St. Clair south	26		
West	6 in.	Bell	S. L. Euclid avenue, to pipe in Cedar avenue	1346		
"	6 in.	Bertram	S. L. Cedar avenue south	559		
South	6 in.	Bliss	Pipe in Petrie street to 103½ W. of Gray street	1674		
East	6 in.	Bond	14½ N. of Superior street north	89		
West	6 in.	Brighton	Pipe in Clark avenue south	698		
East	6 in.	Brooker	Pipe in Garden street north	858		
West	6 in.	Brookfield	19 ft. N. of Euclid avenue north	1479		
East	6 in.	Brunswick	Pipe in St. Clair street, to 41 ft. S. of St Clair street	78		

Side.	Size.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
South	6 in.	Buhrer	Pipe in Jennings avenue east	300		
"	6 in.	Carry	Pipe in Armitage street west	327		
"	6 in.	Central Viaduct	" " Jennings avenue	377		
East	6 in.	Clifton	" " St. Clair street, to S. L. St. Clair street	42		4 to 6 in. relaid.
West	6 in.	Congress	" " Quincy street, to S. L. Quincy street	22		
East	6 in.	Cornell	" Euclid avenue, to 9 S. of Euclid avenue	57		
South	6 in.	Czar	West line Broadway west	665		
East	6 in.	Davies	976 ft. north of Broadway west	167		
North	6 in.	Davies court	450 ft. W. of Sawtell avenue west	326		
South	6 in.	Deering	Pipe in Fairmount street, to Mariner street	727		
	6 in.	Dibble	15 ft. E. of Willson Ave. east	651		
South	6 in.	Dix	12 ft. W. of E. Madison Ave. west	497		
"	6 in.	Edwards	Pipe in Quincy street to S. L. Garden street	1035		
East	6 in.	"	104 ft N. of Townsend street to pipe in Platt street	482		
"	6 in.	Ford place	Pipe in Euclid Ave. to 124 ft north of Euclid avenue	44		
"	6 in.	Frankfort	E. L. Water street to W. L. Bank street	481		4 to 6 in. relaid.
South	6 in.	Frazee	Pipe in Petrie street to W. L. Dolloff street	727		
South	6 in.	Freas	Pipe in Bailey street south	886		

East....	6 in.	Kirtland	Pipe in St. Clair st. south	765		
" ..	6 in.	Lawrence	Pipe in St. Clair st., to S. L. St. Clair st	42		4 to 6 in. relaid.
North...	6 in.	Lena	Pipe in Giddings ave. to pipe in E. Madison ave	1637		
" ..	6 in.	Lester	Pipe in Gallup st. to E. L. Gallup st	19		
East ...	6 in.	Liberty	S. L. Lorain st. to 33 ft. S. of Turn st	715		
" ..	6 in.	Lincoln	Pipe in Quincy st. south	634		
West...	6 in.	"	5 ft. N. of E. Prospect st. south	285		
South ..	6 in.	Luther	12 ft. E of Willson ave. to pipe in Norwood st	1614		
East....	6 in	Lyman	Pipe in St. Clair street, to 12 ft. S. of St Clair street	52		4 to 6 in. relaid.
" ..	6 in.	McHenry	Pipe in St. Clair st. to S. L. St. Clair st	40		4 to 6 in. relaid.
West...	6 in.	Mayfield	Pipe in Euclid avenue, to 14 ft. S. of Euclid avenue.	62		
" ..	6 in.	Middle	Pipe in Huron st. to N. L. Huron st	43		
" ..	6 in.	Milton	Pipe in Castle ave. to pipe in Mentor ave	583		
" ..	6 in.	Newell	Pipe in Clark avenue to pipe in Castle ave	565		
East....	6 in.	Norwood	57 ft. S. of Luther st. to pipe in White ave	740		
West...	6 in.	Oakdale	Pipe in Cedar avenue to N. L. Cedar ave	39		
" ..	6 in.	"	Pipe in Cedar ave. south	952		
East....	6 in.	O'Connor	" " Euclid avenue, to 12 ft. north of Euclid ave	44		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1896—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
East	6 in	Gallup.	N. L. Broadway north	875		
"	6 in	Giddings.	Pipe in Beecher ave. to pipe in Lena ave.	104		
West.	6 in	"	" " Cedar ave. to S. L. Cedar ave.	98		
"	6 in	"	S. L. Cedar ave. to pipe in Garden st	1540		
East	6 in	Goulding.	Pipe in S. Woodland ave. north	899		
South	6 in	Hamilton	" " Case ave. to 375 ft. E. of Belden ave.	1440		
West	6 in	Harrison	" " Hill st. to 8 ft. S. of Hill st.	46		
East	6 in	"	From end of pipe near Canal st. south	19		
"	6 in	Hayward	S. L. Prospect st. S. to connect with 3 in. pipe	86		
South	6 in.	Highland.	Pipe in Fairmount st. east	89		
West	6 in	Hoadley	" " St. Clair st. south	23		4 to 6 in. relaid.
South	6 in.	Holmden	303 ft. E. of Grove lane east	183		
"	6 in.	Holyoke court	820 ft. W. of Sawtell ave. west	84		
West	6 in.	Humboldt	Pipe in Croton st. to 14 ft. S. of Croton st	88		4 to 6 in. relaid.
"	6 in.	"	14 ft. S. of Croton st. to pipe in Pisek st	840		
North	6 in.	Jefferson.	Pipe in Fremont st. to pipe in Pelton ave.	577		
South	6 in.	Jewett.	" " Petrie st. to 141 ft. W. of Colorado st.	1100		
North.	6 in.	Kingsbury Run Viaduct	Pipe in Humboldt st. west	94		

Side.	Size.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
East....	6 in.	Kirtland	Pipe in St. Clair st. south	765		
" ..	6 in.	Lawrence	Pipe in St. Clair st., to S. L. St. Clair st	42		4 to 6 in. relaid.
North...	6 in.	Lena	Pipe in Giddings ave. to pipe in E. Madison ave	1647		
" ..	6 in.	Lester	Pipe in Gallup st. to E. L. Gallup st	19		
East ...	6 in.	Liberty	S. L. Lorain st. to 33 ft. S. of Turn st	715		
" ..	6 in.	Lincoln	Pipe in Quincy st. south	634		
West...	6 in.	"	5 ft. N. of E. Prospect st. south	285		
South ..	6 in.	Luther	12 ft. E of Willson ave. to pipe in Norwood st	1614		
East....	6 in	Lyman	Pipe in St. Clair street, to 12 ft. S. of St Clair street	52		4 to 6 in. relaid.
" ..	6 in.	McHenry	Pipe in St. Clair st. to S. L. St. Clair st	40		4 to 6 in. relaid.
West...	6 in.	Mayfield	Pipe in Euclid avenue, to 14 ft. S. of Euclid avenue.	62		
" ..	6 in.	Middle	Pipe in Huron st. to N. L. Huron st	43		
" ..	6 in.	Milton	Pipe in Castle ave. to pipe in Mentor ave	583		
" ..	6 in.	Newell	Pipe in Clark avenue to pipe in Castle ave	565		
East....	6 in.	Norwood	57 ft. S of Luther st. to pipe in White ave	740		
West....	6 in.	Oakdale	Pipe in Cedar avenue to N. L. Cedar ave	39		
" ..	6 in.	"	Pipe in Cedar ave. south	952		
East....	6 in.	O'Connor	" " Euclid avenue, to 12 ft. north of Euclid ave	44		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size.	Streets.	Between What Points.	Ft. Laid	Total.	Remarks.
East..	8 in.	Ansel	100 ft. S. of Hough Ave. north	368		
West ..	8 in.	Bank	2 ft S. of Lake St. to 2 ft. N. of Lake street	103		4 in. to 8 relaid.
East....	8 in.	Belden	Pipe in Hamilton St. north	51		
"	8 in.	"	Pipe in St. Clair St 11 ft N. of St. Clair street	71		
" ..	8 in.	Case.	Pipe in St. Clair St. to N. L. of St. Clair St	58		6 in. to 8 relaid.
South ..	8 in.	Cedar	Pipe in Brenton St. to pipe in Giddings avenue	367		
" ..	8 in.	"	Pipe in Burt St. to pipe in S. Bell Ave	655		
" .	8 in.	"	58 ft. E. of Watkins St. to 114 ft. W. of Altoona St	1059		
" ..	8 in.	"	Pipe in Doan St. to 12 ft. E. of Doan St	89		
East ...	8 in.	Coe	Pipe in St. Clair St. to N. L. St. Clair St	62		
" ..	8 in.	E. Madison	Pipe in Superior St. to N. L. Decker Ave	744		
" ..	3 in.	E. Madison	N. L. Grand Ave. to 22 ft. S. of Rawlings Ave	893		
South..	8 in.	E. Prospect	248 ft. E. of Schiely Court East	181		
" ..	8 in.	" "	Pipe in Bolton Ave. west	854		
West...	8 in.	Fairmount	17 ft S. of Euclid Ave. to pipe in Highland street	1036		
East....	8 in.	Genesse	665 ft. N. of Crawford St. north	400		
North.	8 in.	Huron	Pipe in Sheriff St. to E. L. Sheriff St	44		4 in. to 8 in.
East....	8 in.	Kirtland	Pipe in St. Clair St. to 8 ft. N. of St. Clair St.	69		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
South	8 in.	Lake.	Pipe in Water St. to 8 ft. E. of Ontario St.	1743		4 in. to 8 relaid
"	8 in.	Lake.	24 ft. W. of Marquette St. West.	636		
East	8 in.	Marquette.	Pipe in St. Clair St. to 10 ft. S. of St. Clair St.	48		4 in. to 8 relaid.
West	8 in.	Ontario	Pipe in Lake St. to 7 ft. N. of Lake St.	65		
South	8 in.	St. Clair.	Pipe in Case Ave to E. L. McHenry St.	740		6 to 8 in. relaid.
"	8 in.	" "	E. Line McHenry St. to 85 ft. W. of Asylum St.	1866		4 in. abandoned & taken out & 8 in. relaid.
"	8 in.	" "	85 ft. W. of Asylum St. to pipe in Marquette St.	1658		
East	8 in.	Seneca.	2 ft. S. of Lake street to 2 ft. N. of Lake St.	104		4 in. to 8 relaid.
"	8 in.	Sheriff	Pipe in Prospect St., to pipe in Huron St.	491		
"	8 in.	"	Pipe in Huron St. to pipe in Bolivar St.	487		4 in. to 8 relaid.
North	8 in.	S. Woodland.	Pipe in Ellsworth St., to cross in Tennyson St.	302		
"	8 in.	Stanard.	Pipe in Willson Ave. west	18		
South	8 in.	Superior.	Pipe in Giddings Ave. to pipe in E. Madison Ave.	448		
North	8 in.	Woodland.	S. L. Eagle St. to pipe in Ohio St.	619	15213	6 in. abandoned & 8 relaid.

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
East..	6 in.	Aaron.	Pipe in St. Clair St., to S. L. St. Clair St	42		4 to 6 in. relaid.
West	6 in	Abram.	Pipe in Branch avenue south	288		
South..	6 in.	Astor	441 ft. E. of Dunham avenue, to Giddings avenue	843		
East...	6 in	Asylum	Pipe in St. Clair St., to S. L. St. Clair St	38		
North	6 in	Bally	Pipe in Mechanic street, to pipe in Freas avenue	210		
East..	6 in	Ballon..	Pipe in Vivian street, to N. L. Barkwell street	543		
North..	6 in	Beaver.	Pipe in Wilcutt street, to T. in Nicola street	243		
East...	6 in	Beech	7 ft. S. of Garden, to N. L. Scovill avenue	1377		
South	6 in	Beecher	Pipe in Giddings avenue, to 522 ft. W. of Russell avenue	1003		
East.	6 in	Belden.	Pipe in St. Clair south	26		
West.	6 in	Bell.	S. L. Euclid avenue, to pipe in Cedar avenue	1346		
"	6 in	Bertram	S. L. Cedar avenue south	559		
South.	6 in.	Bliss	Pipe in Petrie street to 103½ W. of Gray street	1674		
East..	6 in.	Bond.	14½ N. of Superior street north	89		
West	6 in.	Brighton.	Pipe in Clark avenue south	693		
East....	6 in	Brooker	Pipe in Garden street north.	853		
West ..	6 in	Brookfield..	19 ft. N. of Euclid avenue north	1479		
East	6 in	Brunswick...	Pipe in St. Clair street, to 41 ft. S. of St Clair street	78		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1896—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
South..	6 in.	Buhrer.	Pipe in Jennings avenue east	390		
"	6 in.	Carry	Pipe in Armitage street west	827		
"	6 in	Central Viaduct	" " Jennings avenue	377		
East..	6 in	Clifton.	" " St. Clair street, to S. L. St. Clair street	42		4 to 6 in. relaid.
West.	6 in.	Congress.	" " Quincy street, to S. L. Quincy street	22		
East..	6 in	Cornell.	" Euclid avenue, to 9 S. of Euclid avenue	57		
South	6 in	Czar.	West line Broadway west	665		
East..	6 in	Davies.	976 ft. north of Broadway west.	167		
North..	6 in.	Davies court..	450 ft. W. of Sawtell avenue west	836		
South..	6 in.	Deering.	Pipe in Fairmount street, to Mariner street	727		
	6 in	Dibble..	15 ft. E. of Willson Ave. east	651		
South.	6 in	Dix..	12 ft. W. of E. Madison Ave. west	497		
"	6 in	Edwards.	Pipe in Quincy street to S. L. Garden street.	1035		
East.	6 in.	"	104 ft N. of Townsend street to pipe in Platt street.	482		
"	6 in	Ford place.	Pipe in Euclid Ave. to 124 ft north of Euclid avenue.	41		
"	6 in	Frankfort	E. L. Water street to W. L. Bank street.	481		4 to 6 in. relaid.
South.	6 in	Frazee.	Pipe in Petrie street to W. L. Dolloff street.	727		
South	6 in	Freas	Pipe in Bailey street south.	886		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886 -Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid	Total.	Remarks.
East	6 in	Gallup.	N. L. Broadway north	875		
"	6 in	Giddings.	Pipe in Beecher ave. to pipe in Lena ave.	104		
West.	6 in	"	" " Cedar ave. to S. L. Cedar ave.	26		
"	6 in	"	S. L. Cedar ave. to pipe in Garden st	1540		
East.	6 in	Goulding.	Pipe in S. Woodland ave. north	290		
South	6 in	Hamilton	" " Case ave. to 375 ft. E. of Belden ave.	1440		
West.	6 in.	Harrison	" " Hill st. to 8 ft. S. of Hill st.	46		
East.	6 in	"	From end of pipe near Canal st. south	12		
"	6 in	Hayward	S. L. Prospect st. S. to connect with 3 in. pipe.	86		
South	6 in	Highland.	Pipe in Fairmount st. east	89		
West	6 in	Hoadley.	" " St Clair st south	23		4 to 6 in. relaid.
South.	6 in.	Holmden	303 ft. E. of Grove lane east	182		
"	6 in.	Holyoke court	820 ft. W. of Sawtell ave. west	84		
West.	6 in.	Humboldt.	Pipe in Croton st to 14 ft. S. of Croton st	88		4 to 6 in. relaid.
"	6 in.	"	14 ft. S. of Croton st. to pipe in Pisek st	849		
North	6 in.	Jefferson.	Pipe in Fremont st. to pipe in Pelton ave.	577		
South.	6 in.	Jewett.	" " Petrie st. to 144 ft. W. of Colorado st.	1190		
North	6 in.	Kingsbury Run				
		Viaduct	Pipe in Humboldt st. west.	24		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1896—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
East	6 in.	Kirtland	Pipe in St. Clair st. south	765		
"	6 in.	Lawrence	Pipe in St. Clair st., to S. L. St. Clair st.	42		4 to 6 in. relaid.
North	6 in.	Lena	Pipe in Giddings ave. to pipe in E. Madison ave.	1617		
"	6 in.	Lester	Pipe in Gallup st. to E. L. Gallup st.	19		
East	6 in.	Liberty	S. L. Lorain st. to 33 ft. S. of Turn st.	715		
"	6 in.	Lincoln	Pipe in Quincy st. south	634		
West	6 in.	"	5 ft. N. of E. Prospect st. south	285		
South	6 in.	Luther	12 ft. E. of Willson ave. to pipe in Norwood st.	1614		
East	6 in.	Lyman	Pipe in St. Clair street, to 12 ft. S. of St. Clair street	52		4 to 6 in. relaid.
"	6 in.	McHenry	Pipe in St. Clair st. to S. L. St. Clair st.	40		4 to 6 in. relaid.
West	6 in.	Mayfield	Pipe in Euclid avenue, to 14 ft. S. of Euclid avenue	68		
"	6 in.	Middle	Pipe in Huron st. to S. L. Huron st.	48		
"	6 in.	Milton	Pipe in Castle ave. to pipe in Mentor ave.	583		
"	6 in.	Newell	Pipe in Park avenue to pipe in Castle ave.	565		
East	6 in.	Norwood	57 ft. S. of Luther st. to pipe in White ave.	740		
West	6 in.	Oakdale	Pipe in Cedar avenue to S. L. Cedar ave.	30		
"	6 in.	"	Pipe in Cedar ave. south	922		
East	6 in.	O'Connor	" " Euclid avenue to 12 ft. north of Euclid ave.	44		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size.	Streets.	Between What Points.	Ft. Laid.	Total.	Remarks.
North..	6 in.	Pear.	E. L. Aspen st. to E. L. Gordon ave.	476		
" .	6 in.	Peach.	Pipe in Harbor st. to pipe in Orchard st.	512		
East....	6 in.	Percival..	N. L. Superior st. north	476		
" ...	6 in.	"	Pipe in St. Clair st. to S. L. St. Clair st.	87		
South	6 in.	Perkins	26 ft. W. of Willson ave. west.	1004		
North.	6 in.	Pisek	Pipe in Humboldt st. east.	21		
South.	6 in.	Platt	Pipe in Edwards st. to W. L. Edwards st.	81		
East....	6 in.	Palm.	Pipe in Clark ave. south.	154		
West	6 in.	Professor	Pipe in Jefferson st. to pipe in Starkweather ave.	918		
N. & E.	6 in.	Prague	Pipe in Gordon ave. to N. L. Wine st.	706		
East....	6 in.	Purdy.	" " Lorain st. south	716		
" .	6 in.	Rossiter	" " St. Clair st. to S. L. St. Clair st.	42		4 to 6 in. relaid
North...	6 in.	Rowley.	" " Scranton ave. to 17 ft. W. of Newell st.	1204		
" ...	6 in.	"	21 ft. W. of E. L. Newell st. to E. L. Newell st.	21		
West. .	6 in.	Russell.	Pipe in Beecher ave. south to connect.	82		
East ...	6 in.	Sheriff.	" " Bolivar st. to S. L. Bolivar st.	88		4 to 6 in. relaid.
" ..	6 in.	Southern.	" " Quincy st. south	843		
North	6 in.	Spencer	" " Brunswick st. to pipe in Willson ave.	550		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1896—Continue.

Side.	Size	Streets.	Between What Points.	Ft. Laid.	Total.	
South	6 in.	Star.	East Madison ave. to Siedel st.	1696		
North	6 in.	Stanard	8 in. T Marquette st, west.	536		
South	6 in	Summit.	Pipe in Ontario to pipe in Wood st.	587		
East	6 in.	Swiss	" " Clark ave to pipe in Train st	760		
South	6 in.	Townsend	" " E. Madison ave. to pipe in Edward st.	656		
E & S.	6 in	Train	" " Clark ave. to pipe in Swiss st	1432		
West	6 in	Fremont	" " Jefferson st. to S. L. Jefferson st.	41		
South.	6 in	Trumbull st Ext	" " Davies st. to E. L. Davies st	23		
"	6 in	Twenty-third	" " Waverly st. east	417		
West.	6 in	Vienna	S. L. Cedar ave. south.	1380		
North	6 in.	Vincent	E. L. Bond st. to pipe in Erie st	572		
South	6 in	Vivian	Pipe in Petrie st to pipe in Ballou st	319		
East	6 in	Walter	" " Euclid ave. to 12 ft. S. of Euclid ave	59		
South	6 in	Walton	6 ft. W. of Rhodes ave. to E. L. Pollock st	796		
East	6 in	Waring	Pipe in St. Clair st. to 8 ft. S. of St. Clair st	50		4 to 6 in. relaid.
"	6 in.	Waverly	S. L. Lorain st. south	914		
South	6 in	White.	Pipe in Norwood st west to connect.	94		
"	6 in	Willey.	" " Scranton ave. east	41		
"	6 in	York st. Ext.	" " Mill st to T in York st.	443		

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1886—Continued.

Side.	Size	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
	6 in.	For Hydrant		36	53515	
West	4 in.	Beaver C't	Pipe in Beaver st. south	350		
"	4 in.	College alley	" " College st. to pipe in Jefferson st	461		
"	4 in.	Emerson	" " Starkweather ave. to pipe in Auburn st	482		
South	4 in.	Goldsmith C't	" " Florence st. east	324		
North	4 in.	Horace	" " Willett st. to pipe in Greene st	422		
West	4 in.	Josephine	96 ft. S. of Potter C't to 154 ft. N. of Potter C't	906		
East	4 in.	New	Pipe in Quincy st. south	375		
West	4 in.	Park place	S. L. st. Clair st. south	16		
North	4 in.	Pelton alley	Pipe in Pelton ave. west	234		
South	4 in.	Potter C't	" " Moltke st. to pipe in Josephine st	197		
West	4 in.	Terrace	" " Detroit st. south	352		
"	4 in.	Wood	12 ft. N. of S. L. Summit st. to pipe in Summit st	16		
	4 in.	For Hydrants		2388	5883	
East	4 in.	Hubbel C't	280 ft. N. of Detroit st. north	232		
	4 in.	For Hydrants		24	256	

LOW SERVICE DISTRICT.

SCHEDULE OF PIPE TAKEN OUT AND RELAID IN 1896.

Size of Pipe taken Out	Size of Pipe Relaid.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
4 in.	6 in	Aaron	Pipe in St. Clair st. to S. L. St. Clair st.	42		Iron.
4 in.	8 in	Bank	2 ft. S. of Lake st. to 2 ft. N. of Lake st	108		"
6 in	12 in	Burton.	Pipe in Clark ave. north	64		"
6 in	8 in	Case.	" " St. Clair st. to N. L. St. Clair st	58		"
4 in	6 in	Clifton.	" " " " " S. L. " "	42		"
4 in	6 in.	Frankfort	E. L. Water st. to W. L. Bank st.	481		"
4 in	6 in	Hoadley	Pipe in St. Clair st. south	23		"
4 in	6 in	Humboldt	" " Croton st. to 14 ft. south of Croton st	38		"
4 in	8 in.	Huron	" " Sheriff st. to E. L. Sheriff st	44		"
4 in.	8 in	Lake	" " Water st. to 8 ft. E. of Ontario st	1748		"
4 in.	6 in	Lawrence	" " St. Clair st. to S. L. St Clair st	42		"
4 in	6 in.	Lyman	" " " " " 12 ft. S. of St. Clair st	58		"
4 in	6 in.	McHenry.	" " " " " S. L. " " "	40		"

LOW SERVICE DISTRICT.

SCHEDULE OF PIPE TAKEN OUT AND RELAID IN 1886—Continued.

Size of Pipe taken Out	Size of Pipe Relaid.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
4 in.	8 in.	Ontario	Pipe in Lake st. to 7 ft. N. of Lake st	65		Iron.
4 in.	6 in.	Rossiter	Pipe in St. Clair st., to S. L. St. Clair st	42		"
6 in.	8 in.	St. Clair	" " Case ave. to E. L. McHenry st	740		"
4 in.	8 in.	"	" " Hondley st. to 85 ft. W. of Asylum st	658		"
4 in.	8 in.	Seneca	2 ft. S. of Lake to 2 ft. N. of Lake st	104		"
4 in.	8 in.	Sheriff	Pipe in Huron st. to pipe Bolivar st	487		"
4 in.	6 in	"	" " Bolivar st. to S. L. " "	88		"
4 in.	6 in	Waring	" " St. Clair street, to 8 ft. S. of St. Clair street	50		"
4 in.	4 & 6 in	For Hydrants		60		
3 in	4 in.	" "		144	5160	

PIPE ABANDONED IN 1886.

Size of Pipe Relaid.	Street.	Between What Points.	Ft. Laid.	Total.
4 in.	St. Clair	Pipe in McHenry st. to pipe in Hoadley st	728	
6 in.	Woodland	S. L. Eagle st. to pipe in Ohio st	619	1347

LOW SERVICE DISTRICT.

TOTAL FEET OF PIPE LAID TO DECEMBER 31st, 1886.

Diameter of Pipe	36 in.	30 in.	24 in.	20 in.	16 in.	12 in.	10 in.	8 in.	6 in.	4 in.	3 in.
Previous to 1886	14,198	42,037	12,164	11,095	14,775	11,871	71,132	190,299	558,756	181,894	14,789
Error in report of 1885				....	....	....	Deduct 21	Add 21	......	......	......
							71,111	190,320			
Laid in 1886	......	3,793	..	10	....	129	4,420	15,218	53,515	5,583	356
Total	14,198	45,830	12,164	11,105	14,775	12,000	75,531	205,538	612,271	187,477	15,145
Taken out and abandoned in 1886				....	....	....	....	....	1,481	4,882	144
Total in use	14,198	45,830	12,164	11,105	14,775	12,000	75,531	205,538	610,790	182,595	15,001
	98,072					1,061,450					

RECAPITULATION.

98,072 feet of supply main.	equal to	18 miles	3,032 feet.
1,051,450 feet of distributing main.	equal to	199 miles	730 feet.
1,149,522 feet of main	equal to	217 miles	3,762 feet.
3,803 feet of increased supply main in 1886.	equal to	0 miles	3,803 feet
73,009 feet of increased distributing main in 1883.	equal to	13 miles	4,369 feet
76,812 feet of Main in 1886.	equal to	14 miles	2,892 feet

LOW SERVICE DISTRICT.

SCHEDULE OF PIPE LOWERED IN 1886.

Size.	Street.	Between What Points.	Feet.	Total.	Remarks.
8 in.	Ansel	245 ft. S. of Republic st. south	245		
4 in.	Academy	St. Clair st. to Lake st	618		
8 in.	Bolton	Cedar ave. south	1634		
6 in.	Case	Pipe in St. Clair st. north	70		
6 in.	"	N. L. St. Clair st south	14		
6 in.	Commercial	At intersection of Hill st	88		
6 in.	Davies	Broadway north	666		
8 in.	Ellsworth	Pipe in Woodland ave. south	515		
6 in	Edwards	Quincy st. to Keyes st	348		
6 in.	Forest	200 ft. N. of Burwell st. to Croton st	521		
8 in.	Gordon	Clark ave. north	925		
6 in.	Hill	Ohio st. west	887		
8 in.	Hough	850 ft. E. of Willson ave. west	870		
8 in.	Lawrence	Pipe in St. Clair st. to N. L. St. Clair st	56		
6 in.	"	N. L. St. Clair st south	26		
4 in.	"	Pipe in St. Clair st north	75		

LOW SERVICE DISTRICT.

SCHEDULE OF PIPE LOWERED IN 1896—Continued.

Size.	Street.	Between what Points.	Feet.	Total.	Remarks.
6 in.	Lime.	S. Water st. to bridge across Valley R'y.	1060		
6 in.	McHenry.	S. L. St. Clair st. south	80		
4 in.	Orchard.	Lorain st. to Peach st.	668		
6 in.	Phelps.	Pipe in St. Clair street, to 50 ft. S. of St. Clair street	93		
8 in.	Quincy.	New st. to First ave.	800		
4 in.	Rossiter.	S. L. St. Clair st south	44		
8 in.	St. Clair.	Sterling ave. to Case ave.	8664		
6 in.	Sterling.	Pipe in St. Clair st. south.	42		
6 in.	Wason.	26 ft. N. of St. Clair st. to 50 ft. S. of St. Clair st	176	11605	

11,605 feet, equal to 2 miles 1045 feet of pipe lowered.

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN 1890.

Side.	Sizes	Street.	Between what Points.	Ft. Laid.	Total.	Remarks.
East	12 in	Baldwin	Pipe in Quincy st. north	495		
"	12 in	"	From pipe in Baldwin st. at 807 ft. north	81		
			Of Quincy st. west to connect with S. basin of Fairmount Reservoir			
West	12 in	Fairmount	12 feet N. of Woodland Hills ave. to 8 in. pipe in Cedar ave.	850		
North	12 in	Quincy	12. ft. E. of Woodland Hills ave. to pipe in Baldwin st.	488	1914	
East	10 in	Atlantic	289 ft. N. of Bessemer ave. to 459 ft. N. of Davies st.	1488		
South	10 in	Cedar	Pipe in Fairmount st. east	59		
East	10 in	Baldwin	End of 12 in pipe in Baldwin st. north	681		
South	10 in	Union	7 ft. W. of Woodland Hills ave west	19	2247	

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN [illegible] Continued.

Side.	Sizes.	Street.	Between what Points.	Ft. Laid.	Total.	Remarks
East	8 in.	Baldwin	End of 10 in. pipe in Baldwin st to pipe in Fairmount st.	321		
South	8 in.	Cedar	Pipe in Fairmount st. west	38		
North	8 in	Fairmount	" " Baldwin st. to E. L. Baldwin st.	21		
South	8 in.	Miles	10 in. pipe in Woodland Hills ave. to T in McConnell st	857		
West	8 in.	Sawyer	Pipe in Harvard st. to N. L. Harvard st.	36		6 to 8 in relaid.
"	8 in.	"	N. L. Harvard st. to 39 ft. N. of Richmond st	1192	2465	
"	6 in.	Axtell	28 ft. S. of Marble st. south	246		
South	6 in.	Cedar	14 ft. W. of Fairmount st. to 174 ft. W. of Stark ave	638		
West	6 in.	Fairmount	Cross in Stark ave. to 8 in. pipe in Cedar ave.	889		
North	6 in	"	Pipe in Baldwin st. west	573		
South	6 in.	"	344 ft. E. of Woodland Hills ave. east	140		
"	6 in.	Hughes	W. L. Broadway west.	11		
"	6 in.	Miles	T in McConnell st. to city limits	829		
"	6 in.	" Park	E. L. Broadway to pipe in Sawyer st.	377		
West	6 in	Ruggles	Pipe in Miles st. to S. L. Pratt st.	601		
"	6 in	Sawyer	S. L. Harvard st. to pipe in Miles Park st	710		
"	6 in	Stark	Pipe in Fairmount st. south.	14		

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING THE EXTENSION OF WATER PIPE IN [illegible]—Continued.

Side.	Size.	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
South	6 in	Sawyer	E. L. Broadway east	11		
"	6 in	Walker	Pipe in Sawyer st. to W. L. Sawyer st.	91		
West	6 in	Waldo	N. L. Harvard st. north	15		
North	6 in	Whitehead	Valve at E. L. of C. and P. R. east.	13		
South	6 in	Wise	E. L. Broadway east	29		
		For Hydrants		94	5107	
	4 in	Baldwin	From pipe in Baldwin st. at 884			
		Fountain	Pipe west of Quincy street west to connect with 4 inch pipe in S. basin of Fairmount reservoir.	77		
	1 in	Baldwin st	From pipe in Baldwin st. at 960			
		Fountain	Pipe S. of Fairmount st. west to connect with 4 inch pipe in N. basin of Fairmount reservoir.	74		
West	4 in	Fairmount	At Highland st., from 8 inch pipe in Fairmount st. to 6 inch pipe in Fairmount street, connecting high and low service pipes.	19		
	4 in	For Hydrants		319	489	

HIGH SERVICE DISTRICT.

SCHEDULE OF PIPE TAKEN OUT AND RELAID IN 1886.

Size of Pipe taken Out	Size of Pipe Relaid	Street.	Between What Points.	Ft. Laid.	Total.	Remarks.
6 in.	8 in	Sawyer	Pipe in Harvard St., to N. L. Harvard St.	36	36	Iron.

HIGH SERVICE DISTRICT.

TOTAL FEET OF PIPE LAID TO DECEMBER 31st, 1886.

Diameter of Pipe.	36 in.	30 in.	24 in.	20 in.	16 in.	12 in.	10 in.	8 in.	6 in.	4 in.	3 in.
Laid previous to 1886	....	16,308	2814	6070	3378	11,159	3194	2474	1771	970	....
Laid in 1886	....	....	....	....	....	1214	2233	2465	5107	482	....
Total	....	16,308	2814	6070	3378	12,373	5427	4939	6878	1452	....
Taken out in 1886	....	....	....	....	....	....	....	....	36	....	....
Total in use	....	16,308	2814	6070	3378	12,373	5427	4939	6842	1452	
	28,570					31,033					

RECAPITULATION.

28,570 ft. of supply main .... equal to 5 miles 2170 feet.
31,033 ft. of distributing main .... equal to 5 miles 4633 feet.

59,603 ft. of main .... equal to 11 miles 1523 feet.
11,465 ft. of increased distributing main .... equal to 2 miles 905 feet.

MILEAGE OF PIPE IN LOW AND HIGH SERVICE DISTRICTS.

217 miles 3762 ft .... in low service district.
11 miles 1523 ft .... in high service district.

229 miles 5 ft .... in both districts.

14 miles 2892 ft .... increase in low service district in 1896.
2 miles 905 ft .... increase in high service district in 1896.

16 miles 3797 ft .... increase in both districts in 1896

5160 ft. of pipe .... relaid and lowered
2 miles 1045 ft. of pipe .... lowered

3 miles 925 ft. of pipe .... relaid and lowered.

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1886.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	30 in	Burton.	West.	Two ft. S. of N. L. Buckley st.	
1	30 in.	Burton.	West.	N. L. Clark ave.	
2		Total 30 inch stop gates.			
1	12 in.	Burton	East.	S. L. Clark ave.	
1	6 to 12	Burton.	East.	N. L. Clark ave.	
1	12 in	Burton.	West.	34 feet N. of Clark ave. and 25½ feet east of W. L. Burton st.	Connection valve.
1	12 in.	Burton.	West.	6 feet N. of Cook st. and 26 feet E. of W. L. Burton street.	Connection valve.
4		Total 12 inch stop gates.			
1	10 in	Doan.	West.	S. L. Cedar ave.	
1	10 in.	Doan.	West.	S. L. Frank st.	
1	10 in.	Doan.	West.	N. L. Norman st.	
1	10 in.	Doan.	West.	N. L. Quincy st.	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN [illegible] Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	10 in.	Doan	East	21 feet north of Quincy street and 32 feet east of W. L. Doan street.	Connection valve.
1	10 in.	Euclid	North	E. L. Walter ave.	
1	10 in.	Euclid	North	E. L. Ford place	
1	10 in.	Euclid	North	E. L. O'Connor street	
[illegible]		Total 10 in. stop gates			
1	8 in.	Ansel	East	S. L. Hough ave	
1	4 to 8 in	Bank	West	N. L. Lake street	
1	4 to 8 in	Bank	West	S. L. Lake street	
1	8 in.	Belden	East	S. L. Hamilton street	
1	8 in.	Belden	East	N. L. St. Clair street	
1	6 to 8 in	Case	East	" " " "	
1	8 in.	Cedar	South	E. L. Giddings ave	
1	8 in.	Cedar	South	W. L. Oakdale street from the south	
1	8 in	Cedar	South	W. L. East Madison ave.	
1	8 in.	Cedar	South	E. L. East Madison ave	
1	8 in.	Cedar	South	E. L. Doan street	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1886—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	8 in.	Coe	East	N. L. St. Clair st	
1	8 in.	East Madison	"	S. L. Superior st	
1	8 in.	" "	"	N. L. Decker ave	
1	8 in.	" "	"	N. L. Rawlings ave	
1	8 in.	" Prospect	South	W. L. Bolton ave.	
1	8 in.	Fairmount	West	S. L. Deering st.	
1	8 in.	"	"	N. K. Highland st	
C 1	4 to 8	Huron	North	E. L. Sheriff st. from the south	
1	8 in.	Kirtland	East	N. L. St. Clair st	
C 1	4 to 8	Lake	South	E. L. Water st.	
1	8 in.	"	"	W. L. Bank st	
C 1	4 to 8	"	"	E. L. Bank st	
1	8 in.	"	"	W. L. Seneca st.	
C 1	4 to 8	"	"	E. L. " "	
1	8 in.	"	"	W. L. Ontario st.	
C 1	4 to 8	"	"	E. L. " "	
1	8 in.	Marquette	East	S. L. St. Clair st.	
C 1	4 to 8	Ontario	West	N. L. Lake st	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1896—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
C 1	6 to 8	St. Clair st.	South	E. L. Case ave.	
C 1	6 to 8	" "	"	E. L. McHenry st.	
C 1	4 to 8	" "	"	E. L. Hoadley st.	
1	8 in	" "	"	E. L. Asylum st.	
1	8 in.	" "	"	E. L. Brunswick st	
1	8 in.	" "	"	W. L. Marquette st	
C 1	4 to 8	Seneca	East	S. L. Lake st.	
C 1	4 to 8	"	"	N. L. Lake st	
1	8 in.	Sheriff	"	S. L. Prospect st.	
1	8 in.	"	"	N. L. High st	
1	8 in.	"	"	N. L. Huron st.	
C 1	4 to 8	"	"	S. L. Huron st.	
C 1	4 to 8	"	"	N. L. Bolivar st.	
1	8	Superior	South	W. L. East Madison ave	
C 1	6 to 8	Woodland	North	S. L. Eagle st	
C 1	6 to 8	"	"	N. L. Ohio st	
		Total 8 in. stop gates			

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES IN 1886—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	4 to 6.	Aaron	East	S. L. St. Clair st	
1	6 in.	Abram	West	S. L. Branch ave	
1	6 in.	Astor	South	W. L. Russell ave	
1	6 in.	Asylum	East	S. L. St. Clair st	
1	6 in.	Ballou	"	S. L. Vivian st	
1	6 in.	"	"	N. L. Barkwell st	
1	6 in.	Beaver	North	E. L. Nicola st	
1	6 in.	Beech	East	696 ft. N. of Scovill ave	
1	6 in.	Becher	South	W. L. Russell	
1	6 in.	"	"	W. L. Giddings ave	
1	6 in.	Bell	West	637 ft. N. of Cedar ave.	
1	6 in.	"	"	N. L. Cedar ave	
1	6 in.	Bliss	South	W. L. Petrie st	
1	6 in.	"	"	E. L. Colorado st	
1	6 in	Brighton	West	S. L. Clark ave	
1	6 in.	Brooker	East	N. L. Garden st	
1	6 in	Brookfield	West	1000 ft. N. of Euclid ave	
1	6 in.	Brunswick	East	S. L. St. Clair st	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1896—Continued.

Number.	Size.	Streets.	Side.	Location.	Remarks.
1	6 in.	Buhrer	South	E. L. Jennings ave	
1	6 in.	Burton	East	S. L. Howlett st	
1	6 in.	Carry	South	W. L. Armitage st	
1	6 in.	Central Viaduct	"	W. L. Jennings ave	
1	4 to 6	Clifton	East	S. L. St. Clair st	
1	6 in.	Congress	West	S. L. Quincy st	
1	6 in.	Cornell	East	S. L. Euclid ave	
1	6 in.	Czar	South	W. L. Broadway	
1	6 in.	Deering	"	E. L. Fairmount st	
1	6 in.	Edwards	East	N. L. Platt st	
1	6 in.	"	"	N. L. Quincy st	
1	6 in.	"	"	S. L Garden st	
1	6 in.	Ford place	"	N. L. Euclid ave	
1	6 in	Frazee	South	E. L. Petrie st	
1	6 in.	"	"	W. L. Doloff st	
1	6 in.	Freas	East	S. L. Bailey st	
1	6 in.	Giddings	West	S. L. Cedar ave	
1	6 in.	"	"	N. L. Garden st	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1886—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Giddings	West	607 ft. N. L. of Garden st	
1	6 in.	Goulding	East	N. L. South Woodland ave	
1	6 in.	Hamilton	South	E. L. Case ave	
1	6 in.	"	"	W. L. Belden st	
1	6 in.	Harrison	West	S. L. Hill st	
1	6 in.	Highland	South	E. L. Fairmount st. from the south	
C 1	4 to 8	Humboldt	West	S. L. Croton st	
1	6 in.	Jefferson	North	W. L. Fremont st.	
1	6 in.	"	"	E. L. Pelton ave	
1	6 in.	Jewett	South	W. L Petrie st	
1	6 in.	"	"	E. L. Colorado st	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1895—Continued.

Number.	Sizes.	Streets.	Side.	Location.	Remarks.
1*	6 in.	Kingsbury Run Viaduct	North	W. L. Humboldt st	
1	6 in.	Kirtland	East	S. L. St. Clair st.	
C 1	4 to 6	Lawrence	ast	" " " "	
1	6 in.	Lena	North	E. L. Giddings ave	
1	6 in.	"	North	W. L. East Madison ave	
1	6 in.	"	North	657 ft. west of East Madison ave.	
1	6 in.	Lester	North	E. L. Gallup st	
1	6 in.	Liberty	East	S. L. Lorain st.	
1	6 in.	"	East	S. L. Turn st	
1	6 in.	Lincoln	West	N. L. East Prospect st	
1	6 in.	"	West	S. L. East Prospect st	
1	6 in.	"	East	S. L. Quincy st	
1	6 in.	Literary	South	W. L. Professor st.	
1	6 in.	Luther	South	W. L. Norwood	
1	6 in.	"	South	685 ft. east of Madison	
C 1	4 to 6	Lyman	East	S. L. St. Clair st	
1	6 in.	Mayfield	West	S. L. Euclid ave	
1	6 in.	Middle	We s	N. L. Huron st	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP-GATES SET IN 1886—Continued.

Number.	Sizes.	Street.	Side.	Location.	Remarks.
1	6 in.	Milton	West	S. L. Mentor ave	
1	6 in.	Milton	West	N. L. Castle ave	
1	6 in	Newell	West	S. L. " "	
1	6 in.	"	West	N. L. Clark ave	
1	6 in.	"	West	N. L. Rowley st	
1	6 in.	Norwood	East	N. L. White ave	
1	6 in.	Oakdale	West	N. L. Cedar ave	
1	6 in.	"	West	S. L. " "	
1	6 in.	O'Connor	East	N. L. Euclid ave	
1	6 in.	Pear	North	W. L. Aspen st	
1	6 in.	Pear	North	E. L. Gordon ave	
1	6 in.	Peach	North	E. L. Harbor st	
1	6 in.	Percival	East	S. L. St. Clair st	
1	6 in.	Perkins	South	E. L. Belden ave	
1	6 in.	Pisek	North	E. L. Humboldt	
1	6 in.	Platt	South	W. L. Edwards st	
1	6 in.	Prim	East	8 ft. N. of S. L. Clark ave	
1	6 in.	Professor	West	N. L. Starkweather ave	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP-GATES SET IN 1888—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	6 in.	Professor	West	S. L. Jefferson st	
1	6 in.	Prague	North	E. L. Gordon ave	
1	6 in.	Purdy	East	S. L. Lorain st	
C 1	4 to 6	Rossiter	East	S. L. St. Clair st	
1	6 in.	Rowley	North	E. L. Scranton ave	
1	6 in.	"	North	E. L. Grove lane	
1	6 in.	"	North	E. L. Newell st	
1	6 in.	Southern	East	S. L. Quincy st	
1	6 in.	Spencer	North	E. L. Brunswick st	
1	6 in.	Spencer	North	W. L. Willson ave	
1	6 in.	Star	South	E. L. East Madison ave	
1	6 in.	Star ave	"	W. L. Smiley ave	
1	6 in.	Standard	North	W. L. Marquette st	
1	6 in.	Summit	South	E. L. Ontario st	
1	6 in.	Swiss	East	S. L. Clark ave	
1	6 in.	Townsend	South	E. L. East Madison ave	
1	6 in.	"	"	W. L. Edwards st	
1	6 in.	Train	East	N. L. Clark ave	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1886—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	4 to 6	Train	South	W. L. Swiss st	
1	6 in.	"	"	W. L. Hamburgh st.	
1	6 in.	Tremont	West	S. L. Jefferson st.	
1	6 in.	Trumbull st. ext.	South	E. L. Davies st.	
1	6 in.	Twenty third	"	E. L. Waverly st.	
1	6 in.	Vincent	North	W. L. Erie st.	
1	6 in.	Vivian	South	W. L. Petrie st.	
1	6 in.	Walter	East	S. L. Euclid ave.	
C 1	4 to 6	Waring	"	S. L. St. Clair st.	
1	6 in.	Waverly	"	S. L. Lorain st.	
1	6 in.	Willey	South	E. L. Scranton ave	
1	6 in.	York st. Ext	"	E. L. Mill st.	
2	6 in.	For hydrants.			
116		Total 6 in. stop gates.			

LOW SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1888—Continued.

Number.	Sizes.	Street.	Side.	Location.	Remarks.
1	4 in.	Beaver c't	West	S. L. Beaver st.	
1	4 in.	College alley	West	S. L. College st.	
1	4 in.	" "	West	N. L. Jefferson st.	
1	4 in.	Emerson	West	S. L. Starkweather ave.	
1	4 in.	"	West	N. L. Auburn st.	
1	4 in.	Goldsmith c't	South	E. L. Florence st.	
1	4 in.	Horace	North	E. L. Willett st.	
1	4 in.	"	North	W. L. Green st.	
1	4 in.	New	East	S. L. Quincy	
1	4 in.	Pelton alley	North	W. L. Pelton ave	
1	4 in.	Potter c't	South	W. L. Josephine st.	
1	4 in.	Terrace	West	S. L. Detroit st.	
199	4 in.	For hydrants.			
211		Total 4 in. stop gates.			
4	3 in.	For hydrants.			
4		Total 3 in. stop gates.			

STOP GATES TAKEN OUT ON ABANDONED PIPE IN 1890.

Number.	Size.	Streets.	Side.	Location.	Remarks.
1	4 in.	St. Clair	South	E. L. McHenry st.	

LOW SERVICE DISTRICT.

RECAPITULATION OF STOP GATES SET IN 1886.

Waterway in inches.	36	30	24	20	16	12	10	8	6	4	3	Total.
Reported previous to 1886	10	49	11	19	22	29	106	334	1222	1911	207	3920
Error in report for 1885	....	....	....	....	....	....	Ded. 1	Add 1	....	Ded. 3	Ded 36	....
Set previous to 1886	10	49	11	19	22	29	105	335	1222	1908	171	3881
Set in 1886	....	2	....	....	....	4	8	45	116	211	4	390
Total	10	51	11	19	22	33	113	380	1338	2119	175	4271
Taken out in 1886	....	....	....	....	....	....	....	....	6	27	11	44
Total in use Dec. 31st, 1886	10	51	11	19	22	33	113	380	1332	2092	164	4227

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN [illegible]—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	12 in.	Baldwin	East	N. L. Quincy st.	
1	12 in.	"	"	307¼ ft. north of Quincy street and 24 ft. east of W. L. Baldwin street	Connection valve.
1	12 in.	Quincy	North	W. L. Baldwin st.	
3		Total 12 in. stop gates.			
1	10 in.	Atlantic	East	S. L. Davis st.	
1	10 in.	Baldwin	"	N. L. of middle embankment bet. [illegible] of Fairmount Reservoir	
1	10 in.	Cedar	South	E. L. Fairmount st.	
3		Total 10 in. stop gates.			

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1896—Continued.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	8 in.	Baldwin	East	S. L. Fairmount st	
1	8 in.	Cedar	South	W. L. " "	
1	8 in.	Miles	"	E. L. Woodland Hills ave	
C 1	6 to 8	Sawyer	West	N. L. Harvard st	
1	8 in.	"	"	S. L. Booth st	
1	8 in.	"	"	S. L. Richmond st	
6		Total 8 in. stop gates.			
1	6 in.	Fairmount	West	N. L. Cedar ave from the west	
1	6 in.	"	"	S. L. Highland	
1	6 in.	"	North	W. L. Baldwin st	
1	6 in.	Miles	South	E. L. McConnell	
1	6 in.	Ruggles	West	N. L. Miles st	
1	6 in.	Sawyer	"	N. L. Miles Park st	
1	6 in.	Walker	South	W. L. Sawyer st	
2	6 in.	For hydrants.			
9		Total 6 in. stop gates.			

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING SIZE, NUMBER AND LOCATION OF STOP GATES SET IN 1886.

Number.	Size.	Street.	Side.	Location.	Remarks.
1	4 in.	Baldwin	East	On fountain pipe, 894ft. 6 in. N. of Quincy st. and 32 ft. E. of W. L. Baldwin st.	
1	4 in.	Baldwin	East	On fountain pipe, 289 ft. S. of Fairmount st. and 32 ft. E. of W. L. Baldwin st.	
1	4 in.	Fairmount Reservoir		On fountain pipe, 894⅛ N. of Quincy st. and 9 ft. 9 in. W. of W. L. Baldwin st.	
1	4 in.	Fairmount Reservoir	West	On fountain pipe, 289 ft. S. of Fairmount st. and 9 ft. 6 in. W. of W. L. of Baldwin st	
1	4 in.	Fairmount		7 ft. N. of S. L. Highland st. and 25 ft. E. of W.L.Fairm't st. from the N.	con. valve.
26	4 in	For hydrants			
3	4 in.	For hydrant branches on which hydrants were not set.			
34		Total 4 in. stop gates.			

HIGH SERVICE DISTRICT.

RECAPITULATION OF STOP GATES FOR 1896.

Waterway in inches.	36	30	24	20	16	12	10	8	6	4	3	Total.
Set previous to 1896	...	8	1	8	10	27	19	9	33	51	...	166
Set in 1896	...	...	...	...	...	3	3	6	9	34	...	55
Total	...	8	1	8	10	30	22	15	42	85	...	221
Taken out in 1896	...	...	...	...	...	...	...	...	1	...	...	...
Total in use Dec. 1st, 1896	...	8	1	8	10	30	22	15	41	85	...	220

STOP GATES IN USE IN BOTH DISTRICTS DEC. 31st 1896.

In Low Service district	4227
In High " "	220
Total in both districts	4447

LOW SERVICE DISTRICT.

SCHEDULE SHOWING LOCATION OF FIRE HYDRANTS SET IN 1888.

Number	Sizes.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	East	Ansel	207	N. of Hough ave	
1	4 in.	South	Astor		At Russel ave.	
1	4 in.	"	Astor		At Giddings ave	
1	4 in.	East	Ballou	96	S. of Vivian st.	
1	4 in.	"	Ballou		At Barkwell st.	
C 1	4 in.	West	Bank		At Lake st.	
1	4 in.	North	Beaver		At Nicola st.	
1	4 in.	West	Beaver Court	319	S. of Beaver st.	
1	4 in.	East	Beech	346	S. of Garden st	
1	4 in.	"	"	688	" " "	
1	4 in.	"	"	346	N. of Scovill ave.	
1	4 in.	"	"		At Scovill ave.	
1	4 in.	South	Beecher	522	W. of Russell ave.	
1	4 in.	"	"	260	" " "	
1	4 in.	"	"		At Giddings ave	
1	4 in.	East	Belden		At St. Clair st.	
1	4 in.	West	Bell	253	S. of Euclid ave.	
1	4 in.	"	Bell	665	" " "	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1886—Continued.

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	West	Bell	287	N. of Cedar ave	
1	4 in.	"	Bertram	270	S. of Cedar ave	
1	4 in.	"	"	550	" " "	
1	4 in.	North	Bliss		At Ballou st.	
1	4 in.	South	"	307½	W. of Ballou st	
1	4 in.	"	"		At Colorado st	
1	4 in	"	"	60	W. of Snow st.	
1	4 in.	"	"	106½	W. of Gray st.	
1	4 in.	East	Brooker	165	N. of Garden st.	
1	4 in.	"	"	461	" " "	
1	4 in.	"	"	513	" " "	
1	4 in.	West	Brighton	236	S. of Clark ave	
1	4 in.	"	"	667	" " "	
1	4 in.	"	Brookfield	393	N. of Euclid ave	
1	4 in.	"	"	680	" " "	
1	4 in.	"	"	1000	" " "	
1	4 in	"	"	1417½	" " "	
1	4 in.	South	Buhrer	244	E. of Jennings ave	

LOW SERVICE DISTRICT

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1886—Continued.

Number	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	South	Carry	296	W. of Armitage st.	
1	4 in.	"	Cedar	131	E. of Giddings ave.	
1	4 in.	"	"	21	W. of Oakdale st.	
1	4 in.	"	"		At East Madison ave.	
1	4 in.	"	"	360	E. of " "	
1	4 in.	North	Center		At Fall st.	
1	4 in.	South	Central Viaduct	192	W. of Jennings ave.	
1	4 in.	South	" "		At Davidson st.	
1	4 in.	South	Czar	250	W. of Broadway	
1	4 in.	South	"	665	W. of "	
1	4 in.	East	Davies		At Trumbull st. Ext.	
1	4 in.	North	Davies ct.	776	W. of Sawtell ave.	
1	4 in.	South	Deering	362	E. of Fairmount st.	
1	4 in.	South	"		At Mariner st	
1	4 in.	South	Dix	509	W. of E. Madison ave	
1	4 in.	South	Dibble	270	E. of Willson ave	
1	4 in.	South	"	667	E. of " "	
1	4 in.	West	Doan		At Quincy st.	
1	4 in.	West	"		At Quebec st	
1	4 in.	West	"		At Norman st	

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1896 -Continued.

Number	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	West	Doan	132	S. of Arthur st	
1	4 in.	West	"	116	S. of Frank st	
1	4 in.	"	"	196	N. of " "	
1	4 in.	East	East Madison	85	N. of Star ave	
1	4 in.	"	" "	....	At Decker ave.	
1	4 in.	"	" "	22	S. of Rawlings ave.	
1	4 in.	South	" Prospect	387	W. of Bolton ave	
1	4 in.	"	" "	880	W. of " "	
1	4 in.	East	Edwards	....	At Townsend st	
1	4 in.	"	"	....	At Garden st.	
1	4 in.	"	"	87	S. of Lucia.	
C 1	4 in.	"	"	28	S. of Amos st.	
1	3 to 4	South	Elm	90	E. of old River st	
1	4 in.	West	Emerson	......	At Auburn st.	
1	4 in.	North	Euclid ave	287	E. of Adelbert ave	
1	4 in.	"	" "	...	At Walter ave.	
1	4in.	"	" "	......	At Cornell st.	
1	4 in	"	" "	59	E. of Ford place.	
1	4 in	"	" "	160½	W. of O'Conner st	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1890—Continued.

Number.	Sizes.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	North	Euclid ave	189	E. of O'Connor st.	
1	1 in.	West	Fairmount		At Deering st.	
1	4 in	"	"	327	S. of Deering st.	
1	4 in.	East	Forest	23	S. of Burwell st.	
1	4 in.	North	Frankfort	107½	E. of Water st.	
C 1	3 to 4	South	Franklin		At Pearl st.	
1	4 in.	"	Frazee	282	E. of Petrie st	
1	4 in.	"	"		At Dolloff st	
1	4 in.	East	Fross ave	111½	S. of Bailey st	
1	4 in	East	" "	105½	S. of N. Y. C. & St. L. Ry	
1	4 in.	"	" "	448½	" " " " " "	
1	4 in.	"	Gallup	252	N. of Lester st	
1	4 in.	"	"	540	" " "	
1	4 in.	"	Genessee	1065	N. of Crawford st	
1	4 in.	West	Giddings	213	S. of Cedar ave	
1	4 in.	"	"	537	" " "	
1	4 in.	"	"	607	N of Garden st	
1	4 in.	"	"	287	" " "	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1896—Continued.

	Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
	1	4 in.	South	Goldsmith court	200	E. of Florence st.	
	1	4 in.	East	Goulding	365	N. of S. Woodland ave.	
	1	4 in.	South	Hamilton	[illegible]	E. of Case ave.	
	1	4 in.	South	"	285	W. of Belden st.	
	1	4 in.	South	"		At Belden st.	
	1	4 in.	South	"	375	E. of Belden st	
	1	4 in.	South	Highland		At Fairmount st	
C	1	3 to 4	South	Hill		At Commercial st	
	1	4 in.	North	Horace	90	W. of Green st.	
	1	3 in.	East	Hubbell court	274	N. of Detroit st.	
	1	3 in.	East	" "	612	" " "	
	1	4 in.	North	Jefferson	181	E. of Pelton ave.	
	1	4 in.	South	Jewett	318	W. of Petrie st.	
	1	4 in.	South	"	281	E. of Colorado st	
	1	4 in.	South	"	144	W. of Colorado st.	
	1	3 in.	West	Josephine	96	S. of Potter court.	
	1	3 in.	West	"	154	N. of Potter court.	
	1	4 in.	East	Kirtland		At St. Clair st.	

HIGH SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1886—Continued.

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in	East	Kirtland	361	S. of St Clair st	
1	4 in.	"	"	727	S. of St. Clair st.	
1	4 in.	South	Lake st	208½	E. of Water st.	
C 1	3 to 4	North	" "		At Academy st.	
C 1	3 to 4	South	" "		At Bright st.	
1	4 in.	South	" "	271	W. of Marquette st.	
1	4 in.	"	" "	660	W. of " "	
1	4 in	West	Lawrence		At St. Clair st	
1	4 in.	North	Lena.	313	W. of E. Madison ave.	
1	4 in.	North	"	657½	W. of E. " "	
1	4 in.	North	"	590	E. of Giddings ave.	
1	4 in.	North	"	224	E. of Giddings ave.	
1	4 in.	East	Liberty	370	S. of Lorain st.	
1	4 in.	East	"	33	S. of Turn st.	
1	4 in.	East	Lincoln	212	S. of Quincy st.	
1	4 in	East	"	611	S. of " "	
1	4 in.	West	"	201	S. of E. Prospect st.	
1	4 in.	South	Luther	294	E. of Willson ave	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1885—Continued.

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	South	Luther	660	E. of Willson ave.	
1	4 in.	"	"	966	E. of " "	
1	4 in.	"	"	284	W. of Norwood st.	
1	4 in.	West	Milton.	247	S. of Mentor st.	
1	4 in.	East.	New.	841	S. of Quincy st.	
1	4 in.	West	Newell	256	S. of Castle ave	
1	4 in.	East	Norwood.	232	S. of Wade Park ave.	
1	4 in.	West.	Oakdale.	295	S. of Cedar ave.	
1	4 in.	"	"	602	S. of " "	
1	4 in.	"	"	925	S. of " "	
1	6 in.	"	Ontario.		At Lake st	
1	4 in.	North	Peach.	95	W. of Orchard st.	
1	4 in.	"	Pear		At Gordon ave.	
1	4 in.	East.	Percival	130	N. of Superior st.	
1	4 in.	"	"	176	N. of " "	
1	4 in.	South	Perkins.	824	W. of Willsen ave.	
1	4 in.	"	"	596	W. of Willson ave	
1	4 in.	"	"	77	W. of Belden st.	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1890—*Continued.*

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
C 1	8 to 4	East.	Phelps		At St. Clair st.	
1	4 in.	North	Pisek		At Humboldt st	
1	4 in.	North	Prague	225	E. of Gordon ave.	
1	4 in.	East	"		At Wine st	
1	4 in.	West	Professor	295	N. of Starkweather ave.	
1	4 in.	West	"	268	S. of Jefferson st	
1	4 in.	East	Purdy	309	S. of Lorain st	
1	4 in.	East	"	675	" " "	
C 1	3 to 4	East	Rossiter		At St. Clair st	
1	4 in.	North	Rowley	78	W. of Ditton st	
1	4 in.	North	"	26	E. of Grove lane	
1	4 in.	North	St. Clair	90	W. of Case ave.	
C 1	4 to 4	South	" "		At Lyman st	
1	4 in.	South	" "		At Percival st	
C 1	4 to 4	South	" "		At McHenry st	
1	4 in.	South.	" "	322	E. of Brunswick st	
C 1	4 to 4	South	" "		At Hoadley st	
1	4 in.	South	" "	142	W of Marquette st	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING LOCATION OF FIRE HYDRANTS SET IN 1886—Continued.

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
C 1	4 to 4	South	St. Clair	59	W. of Asylum	
C 1	3 to 4	West	Scranton		At Carter st.	
1	6 in.	East	Seneca		At Lake st.	
1	4 in.	"	Sheriff	180	S. of Huron st.	
1	4 in.	North	S. Woodland		At Tennyson st	
1	4 in.	East	Southern	341	S. of Quincy st	
1	4 in	"	"	821	S. of " "	
1	4 in.	North	Spencer	206	E. of Brunswick st.	
1	4 in.	"	Stanard	471	W. of Marquette st	
1	4 in.	South	Star	350	E. of Madison ave.	
1	4 in.	"	"	677	E. of " ".	
1	4 in.	"	"	127	W. of Smiley ave.	
1	4 in.	"	"	156½	E. of " "	
1	4 in.	"	"		At Seedle st	
1	4 in.	"	Summit	223	E. of Ontario st	
1	4 in.	"	Superior	140	W. of E. Madison ave.	
1	4 in.	East	Swiss		At Kidder st.	
1	4 in.	"	"		At Train st.	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1886—Continued.

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	West	Terrace	319	S. of Detroit st.	
1	4 in.	South	Townsend	300	W. of Edwards st.	
1	4 in.	"	Train	144½	E. of Angle in Train st.	
1	4 in.	"	"	127½	W. of Hamburgh st	
1	4 in.	"	"	184	E. " "	
1	4 in.	"	Twenty-third	148	E. of Waverly st	
1	4 in.	West	Vienna	293	S. of Cedar ave.	
1	4 in.	"	"	600	" " "	
1	4 in.	"	"	965	" " "	
1	4 in.	"	"	1360	" " "	
1	4 in.	North	Vincent	100½	E. of Bond st.	
1	4 in.	"	"	154	W. of Erie st.	
1	4 in.	South	Walton	409	W. of Rhodes ave.	
1	4 in.	"	"		At Pollock st.	
1	4 in.	East	Waring		At St. Clair st.	
C 1	3 to 4	East	Wason		" " "	
1	4 in.	East	Waverly	242	S. of Lorain st.	
1	4 in.	East	"	581	" " "	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS SET IN 1896 Continued.

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	East..	Waverly	914	S. of Lorain st	
C 1	3 to 4	South	Willey		At Scranton ave.	
1	4 in.	North	Woodland..		At Ohio st	
C 1	3 to 4	"	"		361 ft. N. of Ohio st	
1	4 in	East..	York.		At York st. extension	
306			Total.			

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS CHANGED IN 1886.

Number.	Size Taken up	Size	Side	Street.	Feet.	Location.	Remarks.
1	4	6 in.	West.	Bank		At Lake st.	
1	3	4 in.	North	Center		At Fall st.	
1	3	4 in.	South	Elm	90	E. of Old River st.	
1	3	4 in.	"	Franklin		At Pearl st.	
1	3	4 in.	South	Hill		At Commercial st.	
1	3	4 in.	North	Lake		At Academy street; changed from south side of Lake st	
1	3	4 in	South	Lake		At Bright street; changed from N. side of Lake street	
1	3	4 in.	East.	Phelps.		At St. Clair st.	
1	3	4 in.	"	Rossiter.		At " " "	
1	4	4 in.	South	St. Clair		At Lyman street; changed from 90 ft. E. of Lyman st.	
1	4	4 in.	South	" "		At McHenry street; changed from 55 ft. W. of Belden st.	
1	4	4 in	South	" "		At Hoadley st.	

LOW SERVICE DISTRICT.

SCHEDULE SHOWING THE LOCATION OF FIRE HYDRANTS CHANGED IN 1896—Continued.

Number	Size Taken up	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4	4 in.	South	St. Clair	50	W. of Asylum st., changed from 120 ft. east of Kirtland st	
1	3	4 in.	West.....	Scranton	.....	At Carter st.	
1	3	4 in.	East.... ..	Wason..	......	At St. Clair st..........................	
1	3	4 in.	South......	Willey...........	....	At Scanton ave., changed from W. side of Scranton ave to E. side......	3 in. valve not taken out.
1	3	4 in.	East	Woodland...........	261	N. of Ohio st., changed from S. L. Eagle st. 261 ft. N. of Ohio st.......	
17				Total.			

325132

LOW SERVICE DISTRICT.

RECAPITULATION OF FIRE HYDRANTS FOR 1886

3 in. hydrants set in 1886	4
4 in. hydrants set in 1886	199
6 in. hydrants set in 1886	3
Total	206
Total hydrants in use Dec. 31, 1885	**1922**
Total	**2128**
Hydrants taken out in 1886	**17**
Total hydrants in use Dec. 31, 1886	**2111**

Of 2111 hydrants in use, 86 are 6 in.; the balance are 3 in. and 4 in.

HIGH SERVICE DISTRICT.

HYDRANTS MOVED IN 1886.

Number.	Size.	Side.	Street.	Feet.	Location.	Remarks.
1	4 in.	South......	Holmden......	421	E. of Grove lane, moved from 369 ft. E. Grove lane. ...	
1	4 in	"	Holyoke place..........	901	W. of Sawtell ave. moved from 880 ft. W. of Sawtell ave.	
1	4 in.	....	Cistern disconnected on west side of Forest st. at Burwell st.			

HIGH SERVICE DISTRICT.

RECAPITULATION OF FIRE HYDRANTS FOR 1886.

4 in. hydrants set in 1886	26
6 in. " " " "	2
Total	28
Total hydrants in use Dec. 31, 1885	63
Total hydrants in use Dec. 31, 1886	91

Of 91 hydrants in use, 15 are 6 in. and 76 are 4 in.

HYDRANTS IN USE IN BOTH DISTRICTS DEC. 31, 1886.

In Low Service District	2,111
In High Service District	91
Total in both Districts	2,202

INVENTORY

OF TOOLS AND MATERIALS AT THE WEST SIDE PUMPING WORKS DEC. 31st. 1886.

Writing desks	2	Pair hip rubber boots	1
Arm chairs	4	Stoves	5
Common chairs	10	Rustic chairs, iron	8
Tables with drawers	4	Grind-stone	1
Tool cupboards	3	Oil-stone	1
Indicator complete	1	Carpenter's square	1
Thermometers	2	Pair car movers	1
Barometer	1	Cross-cut saw	1
Minute glasses	8	Bellows & forge complete	1
Jackplane	1	Portable forge	1
Beading	1	Socket wrenches	26
Axe	1	Lifting screw & ratchet	1
Hand-saw	1	Vises & benches	3
Hand-axe	1	Pipe vise	1
Brooms	14	Hand vises	2
Gauge cocks	3	Hat rack	1
Lubricator glasses	12	Ink stands	2
Zinc oilers	15	Book slate	1

INVENTORY

OF TOOLS AND MATERIALS AT THE WEST SIDE PUMPING WORKS DEC. 31st, 1886—Continued

Drew oil cups	2	Looking glass	1
Brass valve seats for boiler pumps	6	Engine record books	4
Glass globes	10	Coal book	1
Lantern "	3	Pawl wrench and drills	1
Coal shovels	12	Steel yard scales 2,000 lbs	1
Brass screw and nut	1	Platform and one counter scale	1
Bars soap	86	Wagon scale	1
Picks	2	Portable engine and boiler	1
Chisel handles	4	Centrifugal pump and pipe	1
Pick handles	2	Bright wrenches	23
Lbs of cotton waste	225	Common wrenches	35
Chandeliers for lamps	2	Copper hammers	8
Gas chandelier	1	Set ¼ in. figures	1
Key wrenches	2	Spirit level	1
Clock	1	Bulls eye lantern	1
Drop lights	2	Tap wrenches	9
Eye bolts	20	Small shovel	1
Blacksmith tongs	4	Tallow feed cups	2

INVENTORY

OF TOOLS AND MATERIAL AT THE WEST SIDE PUMPING WORKS DEC. 31st, 1886—Continued.

Extra valve weights	64	Screw driver	1
Old piston rings, Henderson engine	4	Crow bars	6
Set old rubber valves for Worthington pump	1	Coal cars	2
Barrel brimstone	1	Traveler bars for cylinder heads	8
Screens for suction wells	12	Steam flue blowers	2
Pair compasses	1	12 in. blank flange	1
Gas lighters	2	Extra bolts, 1½ in	80
Gauge, 1½	1	Winch	1
Screw feed drill	1	Blank flange for stand pipe	1
Cape chisels	12	Lawn mower	1
Flat chisels	4	Rake	1
Hack saw frames	2	Scythe	1
Chipping hammers	2	Long handle shovel	1
Blacksmith hammers	1	Sickle	1
Sledges	8	Drawing table	1
Combination pipe-cutter	1	Drawing boards	2
Short ladders	7	Extra turn tables for R. R. tracks	2
Long ladders	4	Extra feed valves	2

INVENTORY

OF TOOL AND MATERIAL AT THE WEST SIDE PUMPING WORKS DEC. 31st, 1886—Continued.

Step ladders	4	**Fire brick**	700
Barrels tallow	1¼	**Tile, 14x18 in**	11
Barrels of Carbon oil	1	**Tile, 14x24 in**	2
Barrels valvoline	8½	**Dozen water gauge glasses**	1
Dust pans	2	**Half round files**	8
Spittoons	4	**Round files**	6
Lounge	1	**Flat files**	18
Post drill	1	**Steam radiators, 6 feet long**	2
Extra valve seats for Worthington pumps	8	**Pounds journal grease**	17
Extra valve stems, brass	14	**Pairs of gas tongs**	8
Carpenters' benches and vises	2	**Record board**	1
Derricks for gate wells	4	**Recording gauge, old**	1
Extra valves for Henderson engine	45	**Gate wheels, old**	3
Scales weights, 50 pounds each	4	**Steel punches**	6
Slates	8	**Packing hooks**	6
Trestle for cylinder heads	1	**Brass drip pans**	6
Wheel-barrows	5	**Tin drip pans**	4
		Glass lamps with chimneys	6

INVENTORY

OF TOOLS AND MATERIAL AT THE WEST SIDE PUMPING WORKS DEC. 31st, 1885—1886.

Coal barrows	3	Lbs. nails	12
Extra valves for Cameron pump	4	Hair broom	1
Scoop	1	Barrel black paint	½
Valve wrenches	5	Hose nozzle	1
Lanterns	2	Taps	8
Lard oil lantern	1	Ft. ¾ in. rubber hose	100
Torches	4	Ft. 1 in. " "	40
Hand lamps	16	Drills	12
Grate bars	36	Calking tools	10
Coal scuttles	2	Monkey wrenches	7
One gallon oil can	2	Copper washers	75
Four " " "	3	Aqueduct gate	1
Fifty " " tank	1	Fire pokers 11 ft. long	4
Sixty " " tank and pump	1	Long handle fire hoes	3
Coal oil cans	2	" " rake "	2
Tallow can	1	Fire hooks	6
Tin oil pump	1	High horses	2
Tin syringes	4	Low "	4

INVENTORY

OF TOOLS AND MATERIAL AT THE WEST SIDE PUMPING WORKS DEC. 31st, 1886—Continued.

Brass syringes	2	Pails	3
Clam wrench	2	Jack screws	2
Boxes stove polish	2	Extra deck plates for boilers	6
Extra pump cyl. head	1	Double 18 in. blocks for 3¾ in. line	5
½ in. globe valves	8	" 12 in. " " 3 in. "	3
Pop safety valve	1	" 11 in. " " 3 in. "	1
Feet 1 in. packing	15	" 9 in. " " 3 in. "	2
Feet 1½ empire packing	6	Small falls in fire rooms	3
Feet ¾ in. square packing	30	" " for pulling screens	1
Lbs. hemp packing	100	Fathoms of 1¾ in. line	12⅛
Lbs. rubber cloth packing	40	" " 2 " "	6
Oil cupboard	1	" " 2 " "	5
Walnut board 12 ft. by 15 in. by 1 in	1	" " 3⅛ " "	31⅛
Box for ashes	1	" " 3½ " "	33½
Scoop net	1	" " 4¼ " "	33
Ladles	2	" " 6 " "	33
Steam gauge	1	" " 6 " "	30½
Barrels cement	2	" " 3½ " "	13

INVENTORY

OF TOOLS AND MATERIAL AT THE WEST SIDE PUMPING WORKS DEC. 31st, 1866—Continued.

Cast from kettles	2	Lbs. scrap copper, estimated	20
Cast steel chisel bars 6 feet	2	" " brass "	30
Augurs	9	" old lead, estimated	200
Large iron blocks for 6 in. line	2	" scrap iron "	3000
Single 17 in. " " " "	2	Tons of coal "	400
" 14 " " " 4½ in. line	1		

INTENVORY

OF PIPE AND SPECIAL CASTINGS AT WEST SIDE RESERVOIR DEC. 31st, 1890.

36 in pipe	5	20 inch pipe socket 12 feet	1
30 " " socket, 6 feet	1	16 " "	1
30 " " " 5 feet 6 inches	1	36 " sleeves	2
24 inch " " 3 feet	1	20 " "	3
30 " " " 6 feet 7 inches	1	36 " reducing sleeves	2
24 " " plain, 3 feet	1	24 " " "	2
20 " " socket, 9 feet	1	30 to 24 reducer, plain	1

INVENTORY

OF TOOLS AND MATERIALS AT FAIRMOUNT PUMPING STATION DEC. 31st, 1886.

Vise	1	1 in. eye bolts	4
Hammer	1	⅝ in. eye bolts	5
Hand saw	1	½ in. eye bolts	10
Hand axe	1	Eye bolts, 10 in. long	2
12 in. wrench	1	Anvil	1
20 in. wrench	1	Blacksmith hammer	1
Cape chisel	3	Blacksmith forge	1
Flat chisel	3	Pair of tongs	2
Work Bench	1	Sledge	1
Stock and 4 set of dies	1	Set of Fairbanks scales	
Tap wrench and four taps	1	Grindstone	1
2 in. S. wrench	1	Spittoons	6
2½ S. wrench	1	Dust pan	1
14 in. flat file	1	Dust brush	1
16 in. round file	1	Lantern	1
14 in. bastard file	1	Crow bar	3
14 in. fine cut file	1	Picks	2
½ eye bolts	4	Drip cans	1

INVENTORY

OF TOOLS AND MATERIAL AT THE FAIRMOUNT PUMPING STATION DEC. 31st, 1886—Continued.

Step ladders	3
Long "	2
Bale of waste	⅓
Barrel of lard oil	½
" " valvoline	½
" " carbon oil	½
25 inches rubber for air pump	1
25¾ " " " "	1
Ft of ¾ in rubber packing	40
Oak blocks 3 ft. x 8 in. x 12 in	8
Timbers for handling engines on beam floor	4
Box wrenches 1½, 1¾, 2, 2¼, 2¾ and 3 inch	6
Wheel barrows	2
Coal shovels	2
Poker	1
Pinch bar for moving cars	1
Slice bars	1
Shaker bar	1
Hoe	1
Engine wrenches	7
Office desk	1
Register desk	1
Arm chair	4
Common chair	2
Cupboard on cylinder head floor for tools	1
Feet ¾ inch hose	50
Feet 1½ inch hose	50
Oil can for beam center	1
Squirt cans	2
Quart cans	1
Thermometer	1
Rustic iron benches	4
Slates	3
Register books	2
3 inch wrench	1

INVENTORY

OF TOOLS AND MATERIALS AT FAIRMOUNT PUMPING STATION DEC. 31st, 1896 - Continued.

Feet of ¾ in. rope	84	Connection rods	2
Feet of 1½ in rope	88	Iron guards for pump beams	6
Set of 6 in. blocks	1	New grate bars	28
Set of 4 in. blocks	1	New leather tappets	5
Pair of clamps for handling pistons	1	Nozzles and jets for small fountain	7
30 in. valve for pump	1	50 ft. tape line	1
Brick	700	Sheets of emery cloth	28
Fire brick, 12x18x2¾ in	15	Brass nipples for reservoir fountain	26
Common Fire brick	64	Clamp and two screws for handling 30 in. valve	1
Barrels of cement	8	Sledge for beating packing	1
Pounds of ten-penny nails	30	Broom	1
Pounds of 8 in. spike	40	Bolts of cotton wick	42
Pounds of 4 in. spike	25	Pounds of old brass pump chamber	650
Brass valves	5	Pounds of old brass	82
Plunger rods	2		

INVENTORY

OF TOOL AND PIPE CASTINGS AT THE FAIRMOUNT RESERVOIR IN CHARGE KEEPER ON DEC. 31st, 1886—Continued.

Tool boxes	2	Cape chisels	2
6 in. wrench	1	Pair of 12 inch blocks and ropes	1
Hydrant wrench	1	Scythe and snath	1
Air cock "	1	Spade	1
Monkey wrench	1	Lawn rake	1
Bars of lead	5	Garden rakes	8
Sledge hammers	8	Sickle	1
Stone picks	8	Hoe	1
Picks	15	Hose reel	1
Lanterns	8	Ft. of ¾ hose	100
Saw	1	Axe	1
Ladle rest	1	20 inch pipe	5
Ladle	1	16 " "	1
Tunnelling shovels	8	10 " "	7
Furnaces and lead pots	2	8 " "	1
Set of calking tools	1	6 " "	12
Calking hammer	1	4 " "	5
Cold sets	4	Ft. of old 4 inch pipe	200

INVENTORY

OF TOOLS, PIPE, CASTINGS, ETC., AT FAIRMOUNT RESERVOIR IN CHARGE OF KEEPER DEC. 31, 1886—Continued.

Pieces of 4 in. pipe socket, 3 to 5 ft. long	78	6⅛ bends	4
12 ⅛ in. bends	4	4⅛ in. bends	1
8 in. crosses	2	8 to 6 in. reducers	3
8 to 6 in. crosses	1	8 to 4 reducers	1
6 in. tee	1	6 to 4 reducers	2
6 to 4 in. tee	1	6 in. elbow	1
6 in. gas tee	1	Fire hydrants	13
6 1/16 in. bends	4		

INVENTORY

OF TOOLS AND MATERIAL AT KINSMAN ST. RESERVOIR DEC. 31st, 1866.

Fence pickets	5004	Valve wrench	1
Pieces 2 x 4 inches x 16 feet	186	Ft. ¾ hose	50
" 3 x 3 x 16	6	Cold chisel	1
" 1 x 12 x 16	24	Post hole diggers	2
Wheel for valve rod	1	Tamping bars	6
Wheel barrows	7	Paint brushes	3
Shovels	2	Grind stone	1
Picks	7	Scythes	3
Mattocks	2	Scythe snaths	2
Stone picks	3	Gallons of paint	21
Stone hammer	1	Packages of anti-kalsemine	14
Pitch fork	1	Kegs of nails	3
Hay rake	1	Lbs. of lime	150
20 inch pipes	3	Pine plank 2 x 12 inches x 16 feet	30
20 pipes 10 x 6 inches	1	20 inch sleeves	2
20 " 4 x 6 "	1	Chains for pipe laying	3
20 " 6 x 6 "	1	20 inch curve	1
20 " 3 feet	2		

INVENTORY

OF PIPE AND CASTINGS AT WEST SIDE RESERVOIR DEC. 31, 1886.

36 in. pipe	1	6 in reserved curves	1
30 " "	8	4 " " "	5
24 " "	9	3 1-16 curve	1
20 " "	4	6⅝ in. "	1
16 " "	2	4½ " "	4
12 " "	2	10 " elbows	3
10 " "	8	6 " "	4
8 " "	1	4 " "	3
6 " "	18	**VALVES.**	
4 " "	2	20 in. valves	2
3 " "	2	16 " "	2
CURVES.		4 " "	1
30 in. curves	2	30 in. socket pipe, 7 ft.	1
20 " "	1	30 " " " 11 ft. 9 in.	1
16 " "	1	30 " " " 11 ft. 10 in.	1
10½ " "	5	30 " " " 9 ft. 6 in.	1
5 " double curves	2	30 " " " 6 ft.	1
5⅝ " curves	26	1 " " " 9 ft. 5 in.	

INVENTORY

OF PIPE AND CASTINGS AT WEST SIDE RESERVOIR—Continued.

30 inch socket pipe 3 feet	1
30 " pipe plain 7 feet	1
36 " socket pipe 4 feet	1
24 " " " 9 feet each	2
12 " " " 10 " "	1
12 " " " 8 feet 6 inches	1
12 " plain pipe from 3 ft. 6 in. to 8 ft. 6 inches long	8
10 " socket " " 3 ft. 7 to 9 feet long	5
10 " plain " " 4 ft. 5 in. to 10 ft. 5 in. long	3
6 " pipe 11 feet	2
6 " " with sockets from 5 feet to 11 feet 5 inches long	8
Old 4 inch pipe 8 feet each	105
4 inch pipe 10 feet	16
Feet of 8 inch plain pipe from 4 to 9 feet long	200
TEES.	
16 inch plain tees	2
12 " tees	1
10 " "	2
6 inch tees	3
4 " "	19
10 to 8 inches tees	3
4 inch tees for cement pipe	14
CROSSES.	
20 " cross	1
10 to 8 inch cross	1
8 inch crosses	5
6 " "	8
4 " "	12
4 " " for cement pipe	2
REDUCERS.	
20 to 8 reducers	1
16 to 12 "	1
12 to 10 "	1
12 to 6 "	1
10 to 8 "	1

INVENTORY

OF PIPE AND CASTINGS AT WEST SIDE RESERVOIR DEC. 31st, 1886—Continued.

10 to 6 reducers	14
8 to 6 "	7
6 to 4 "	1
4 to 2 "	1
30 to 24 " plain	1
8 in. hydrant top cylinders	30
8 in. " bottom cylinders	12
SLEEVES.	
36 in. sleeves	4
30 " "	6
24 " "	2
20 " "	5
16 " "	4
12 " "	5
10 " "	1
8 " "	5
6 " "	6
4 " "	24
3 in. sleeves	2
CLAMPS.	
36 in. socket clamps	2
30 " " "	1
30 in. clamps	3
24 " "	1
20 " "	4
16 " "	4
12 " socket clamps	2
16 " " "	2
20 " " "	2
36 in. plug	1
36 in. plug	1
4 in. cylinder valves boxes	2
4 in. caps	2
4 in. sprinkler tees	3
Valve box covers	48

INVENTORY

OF PIPE AND CASTINGS AT WEST SIDE RESERVOIR DEC. 31st, 1886—Continued.

Bottom frames for valve boxes	9	Set of plates for No. 4 valve box	6
Set of plates for No. 2 valve box	11	Top and base for hitching post	1
Set of plates for No. 3 valve box	25		

INVENTORY

OF OFFICE YARD DEC. 31st, 1888.

Horse	1	10 inch ⅛ bend	1
Wagon	1	8 ‟ ⅛ ‟	3
Harness	1	8 ‟ 1-16 ‟	1
Horse blanket	1	6 ‟ 1-16 ‟	7
Rubber horse cover	1	4 ‟ 7-8 ‟	8
‟ lap robe	1	4 ‟ 1-16 ‟	2
8 inch tees	2	8 ‟ elbow	1
8 to 6 ‟	1	6 ‟ ‟	1
8 to 4 ‟	2	4 ‟ ‟	3
8 inch sprinkler tee	1	3 ‟ ‟	1
6 ‟ ‟ ‟	3	3 ‟ Sleeves	12
6 to 4 tee	1	4 ‟ ‟	
4 inch tee	1	6 ‟ ‟	6
3 inch gas tee	1	8 ‟ ‟	4
10 to 6 reducers	8	4 ‟ head socket	5
8 to ‟	5	6 ‟ cylender valve box covers	2
6 to 4 ‟	5	Sprinkler tops	9
4 to 3 ‟	2	Valve box top frames	6

INVENTORY

OF OFFICE YARD DEC. 31st, 1886—Continued.

Box valve bottom frame	7	4 in. clamp sleeves	7
No. 0 valve boxes	2	6 " " "	8
Valve box covers	10	8 " " "	2
Set of No. 1 plates for valve box	1	10 " " "	5
" " 2 " " " "	3	12 " " "	1
" " 3 " " " "	4	4 " sleeves	3
" " 4 " " " "	1	6 " "	2
4 in. pipe	3	Pair of 4 in. clamps for wood plugs	1
8 in. pipe	2	" " 6 " " " " "	6
4 in. hydrant	34	" " 8 " " " " "	16
6 in. hydrants	7	" " 10 " " " " "	5
4 in. hydrants, old	6	" " 12 " " " " "	1
Bottom cylinder for 3 in. hydrants	4	" 36 in. " for iron plug	1
Tons scrap iron, estimated	4	Feet ¾ chain, two hooks	62
Furnacet with grates	5	Feet ¾ chain, two hooks	34
Lead pots	7	Feet ¾ chain, no hooks	30
Set of differential blocks and chain	1	Feet ¾ chain, with clevis	21
8 in. clamp sleeves	6	Feet ¾ chain, two hooks	15

INVENTORY

OF OFFICE YARD DEC. 31st, 1886—Continued.

Feet ¾ chain, one ring	12	Sprinkler wrenches	1
Feet ⅝ chain, one ring	16	Hydrant wrench for stuffing box	1
Feet ¾ chain	10	Hydrant wrench for valve seat	1
Feet ⅝ chain, hook and ring	6	Five gallon oil cans	1
¾ chains, short, fastened into a ring	3	Fifteen gallon oil cans	2
Feet ½ chain, hook and ring	17	Six gallon oil cans	1
Feet ½ chain, hook and ring	9	One gallon oil cans	2
Pair grappling hooks	1	Torches	3
Manning hydrants in order	19	Lanterns	3
Manning hydrants in bad order	47	Lantern globes, white	2
8 in. valves, with goose necks	16	Lantern globes, red	5
8 in. valves	20	Grindstone	1
6 in. valve	1	Sledges	2
New pails	9	Grub hoe	1
Picks	12	Adze	1
Shovels	6	Axe	1
Hydrant wrenches	3	Die for Manning hydrant	1
Reservoir wrench	1	Chain for wood hydrant	1

INVENTORY

OF OFFICE YARD DEC. 31st, 1886—Continued.

Center covers for cylinder valve boxes	15	Folding derricks	2
Large S wrenches	2	Set of differential blocks and chains	2
Pounds of packing jute	40	30 in. wrench	1
Derrick handles	4		

INVENTORY

IN OFFICE BASEMENT DEC. 31st, 1886.

20 inch wrench for galvin valve	1	Lbs. brass scrap	1870
16 " lever wrench	1	Lbs. lead in bars	2815
6 " " "	1	" " " old joints	800
6 " wrench	1	1 inch brass pumps	2
3 " "	1	1¼ inch brass pumps	2
4 " scowden valve wrench	1	2½ " " "	1
3 " stop cock wrench	1	Tunneling shovels, long	2
Hydrant claw wrench	1	" " short	2
Ice box	1	Maul	1
Globe valves	6	Screws for 20 inch valve, Boston Machine Co	2
Yard duck cloth	1	Crowbars	3
Pair rubber boots	1	Calking hammers	3
Vises	2	Handled calking tools	5
Garden rake	1	Cold sets	10
Trowel	1	Chisels	15
4 inch wood plugs	7	Monkey wrench	2

INVENTORY

IN OFFICE BASEMENT DEC. 31st, 1886—Continued.

Gouges	17	Furnaces with kettles	3
Set of calking tools	2	Lbs. copper scrap	90
Hand saw	1	Pair chain tongs	1
Hatchet	1		

INVENTORY

IN OFFICE BASEMENT DEC. 31st, 1886.

TAPPER'S DEPARTMENT.

3 in. wrenches	3	½ in. brass ferrules	107
6 " "	8	1 " " plugs	17
4 in. Scowden valve wrench	1	¾ " " "	15
Stop cock wrenches	7	⅝ " " "	31
Street washer keys	7	Old brass, No. plates	175
Combination valve wrench	1	Old brass, letter A plates	3
Tapping machines, complete	2	" " " B "	5
Machinists hammer	1	" " " C "	28
⅝ reamers	8	" " " D "	9
¾ "	1	" " " E "	12
1 in. "	1	" " " F "	22
Cold chisel	1	" " " H "	8
50 ft. tape line	1	" " " I "	12
Gauge for lead pipe	1	" " " J "	5

INVENTORY

IN OFFICE BASEMENT DEC. 31, 1886—Continued.

TAPPER'S DEPARTMENT.

Hydrant wrench	1	Horse blankets	2
Monkey wrench	1	¾ brass ferrules	46
Pair of tapping clamps, 4, 6 and 12 in	3	Rubber cover for horse	1
Horse and wagon	1	1 in brass ferrules	15
⅝ brass ferrules	65	Rubber lap robe	1

INVENTORY

IN OFFICE BASEMENT DEC. 31st, 1886.

METER DEPARTMENT.

¾ nipples	75	¾ elbows	25
1 inch nipple	60	¾ street elbows	20
¾ " "	249	¾ tees	25
1 " "	200	¾ couplings	4
1½ " "	46	⅝ unions	40
1¼ " "	22	1 inch couplings	20
2 " "	24	1 inch elbows	25
1 " tees	10	2 x 1¼ reducing couplings	1
1 to ¾ inch tees	2	2 inch plug	1
1 inch unions	6	2 " cap	1
1½ couplings	9	2½ x 2 inch reducing couplings	2
1¼ elbows	9	2½ x 2 inch bushings	2

INVENTORY

IN OFFICE BASEMENT DEC. 31st, [illegible]—Continued.

METER DEPARTMENT.

1¼ st. elbows	4	3 x 2 bushings	2
1¼ couplings	2	3 x 2½ reducing coupling	1
1¼ x ¾ tees	2	3 inch couplings	1
1½ elbows	4	4 to 3 inch bushings	3
1½ st. elbows	8	3 inch plug	1
1½ tees	2	4 " "	1
1½ x 1 x ¾ tees	4	Pair ¾ tongs	4
1½ x ¾ "	1	" 2 in. tongs	2
1½ x 1 "	1	" 3 " "	2
1½ Unions	2	Monkey wrenches	6
2 inch elbows	7	Files	2
2 " st. elbows	4	½ dies	3
2 " couplings	2	Radial	6
2 " unions	5	1 inch dies	4
¾ plugs	2	1¼ " "	2
¾ caps	2	1½ " "	2
1 to ¾ bushings	8	2 " "	2

INVENTORY

OF OFFICE BASEMENT DEC. 31, 1898—Continued.

METER DEPARTMENT.

1 in. plug	7	½ in. guides	3
1 in. caps	2	¾ " "	2
1x¾ reducing couplings	4	1¼ " "	1
1¼ to 1 in. bushings	10	1½ " "	1
1½ to 1¼ in. "	3	Small stocks	2
1½ in. caps	3	Large stocks	1
2x1½ in. bushings	7	Pipe cutters	2
2x1½ in. reducing couplings	2	Screw drivers	2
Hammers	3	2 in. meter counters, to fasten with pins	1
Hatchet	1	3 " " " " " " "	3
Oil cans	2	4 " " " " " " "	1
Extension wrench	1	Dozen screws for meters	20½
Claw wrench	1	⅝ dial plates	9
Hand saw	1	1 in. dial plates	4
Square	1	2 " " "	18
Stone chisels	18	⅝ meters, in order, old	18
Stop cock wrench	1	1 in. meters, in order, old	6

INVENTORY

OF OFFICE BASEMENT DEC. 31st, [illegible]—Continued.

METER DEPARTMENT.

Plumber's furnace and pot	1	⅝ meters, new	12
Key hole saw	1	3 in. meters, new	2
Shave hook	1	1½ in. meter, new	1
Turn pin	1	2 in. meter, new	1
⅝ ratchet for meters	19	1½ in. meter, in order, old	5
1 in. ratchet for meter	12	2 in. meter, in order, old	5
1½ " " " "	11	3 in meter, in order, old	1
2 " " " "	1	Meter vault covers	5
3 " " " "	4	Yards Lake sand	1¼
4 " " " "	3	Barrels of cement	12½
⅝ counter plates for meters	15	Brick	3000
2 in. meter caps	20	Small manhole cover	1
⅝ in. meter caps	25	Sewer manhole	1
4 " counter plate	1	Yards of rubber for washers	1½
⅝ meter counters, new	8	Force pump	1
1 in. " " "	9	Pounds of ¼ in. sheet lead	22
1½ in. " " "	4	Hand braces	2

INVENTORY

IN OFFICE BASEMENT DEC. 31st, 1886—Continued.

METER DEPARTMENT.

2 inch meter counters, new	1	Pair of compasses	1
1 " " " "	1	Draw shave	1
1 inch meter counter, new, to fasten with pins	7	Plug taps	4
1½ " " " " " " "	2	Hack saw	1
Washer cutters	2	Wood bits	4
Oil stone	1	Feet of 2 inch pipe	106
Jack plane	1	" " 1½ " "	27
Soldering iron	1	" " ¾ " "	64
Pair of pliers	1	" " 1 " "	41
¾ stop cock	1	" " 1¼ " "	16
Brass pump	1	" " 2½ " "	15
Rubber cushions for 2 inch meter	4	" " ½ " "	10

INVENTORY

OF C. MARQUARDTS' TOOL BOX DEC. 31st, 1886.

Picks	46	Short handled tunnelling shovel	2
Calking tools	20	Lanterns	4
Chisels	9	Crow bars	5
Yarning tools	2	Ladles	2
Monkey wrench	1	1 gallon oil cans	2
Fire hydrant wrench	1	Pails	5
Hand saw	1	Sections of hose	4
Axe	1	Pounds of lead	567
Sledge	1	Pounds of packing	70
Calking hammers	4	Cold sets	4
50 ft. tape line	1	Cold chisels	2
Mattocks	2	Standpipes, complete	2
Long handled tunnelling shovel	2		

INVENTORY

OF W. F. THOMPSON'S TOOL BOX DEC. 31st, 1896.

Furnace	1	Ladle	1
Lanterns	5	Extra red globe	1
Sledge	1	Capstan bars	8
Pails	6	Dipper	1
Oil can	1	Crow bar	1
Long handled tunnelling shovel	1	Short handled tunnelling shovel	1
50 ft. tape line	1	Monkey wrench	1
Hydrant wrenches	2	Hose wrench	1
6 inch wrenches	1	Cold sets	5
Chisels	8	Yarning tools	8
Calking tools	13	Hammers	2
Cape chisels	3	Pair of 6 inch clamps	2

INVENTORY

OF W. F. THOMPSON'S TOOL BOX DEC. 31st, 1886—Continued.

6 inch plugs	3	Punches	2
2 " stone drill	1	5-8 brass plugs	3
1 " brass plugs	1	2 inch iron plugs	2
1 " iron "	1	Saw	1
Sections of hose	6	Picks and handles	35
Axe	1	Lbs. of jute packing	60
Lbs. of lead	520		

INVENTORY

OF JOHN PUTTS' TOOL BOX DEC. 31st, 1886.

50 ft. section of hose	2	Lanterns	5
Lantern globes	2	Pounds of packing	50
Pounds of lead	574	Pails	3
Feet ¾ in. diameter rope	50	Crow bar	1
Pick and handles	20	Saw	1
Sledge	1	Long tunnelling shovels	2
Axes	2	Short " "	1
Sprinkler wrench	1	Reservoir wrench	1
Cold sets	5	Handled calking tools	2
Hydrant wrenches	2	Hose wrench	1
Calking tools	10	Hammers	2
Yarning tools	2	Cold chisels	6

INVENTORY

OF JOHN POTTS' TOOL BOX DEC. 31st, 1886—Continued.

Monkey wrench	1	Cape chisels	4
Punches	3	Ditch line	1
One gallon oil cans	2	Grub hoes	2
Ladle	1	Furnace, complete	1
6 in. wrench	1	Water pail and dipper	1
Capstan bars	3	50 ft. tape line	1

INVENTORY

OF TOOLS AND MATERIALS AT LAKE CRIB DEC. 31, 1886.

Snatch block	1	Ice chisels	2
Axe	1	Augurs	14
Ft. of steam hose	50	Crow bars	2
Shackle bar	1	Monkey wrench	1
Iron rakes	3	Shovels	2
" sledges	2	Iron wedges	4
Pair pipe tongs	1	Cross cut saws	2
Hoes	2	Snap hook	1
Iron buckets	3	Ship lamp	1
Wooden buckets	2	Feet 3 inch rope	80
Feet 4 inch rope	50	Feet 2½ inch rope	73
Wheel barrows	2	Hand derrick	1
Rope ladder	1	Wrench for screwing bolts under water	1
Sets iron blocks	2	8 horse power upright boiler and piping for steam heating	1

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS
FOR THE YEAR 1886.
JANUARY.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Freeman & Hall...	Estimate												10000 00			10,000 00
Pay rolls	Labor, etc.	199 24	582 52	1,845 89	1,784 84		255 00	170 50	165 50	212 50	31 50					5,247 00
A. A. Adams, ...	Horse shoeing.		8 00													8 00
A. Augstadt	Boiler repairs.					7 80										7 80
G. C. Barnes	Pipe covering.											286 50				286 50
F. C. Bate	Drafting			100 00												100 00
D. Berliner.	Labor	16 50														16 50
W. Bingham & Co.	Hardware.	3 18	3 75	1 10	17 59	1 80	2 00									29 42
Buckeye Mach. Co.	Iron work										57 98					57 98
S. C. Brooks & Co.	Meter boxes								8 50							8 50
Brooks & Co. ...	Stationery			8 60												8 60
City of Cleveland..	Pavement.	340 32														340 32

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JANUARY.

Bills Rendered by	For.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmont Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Collister & Foster	Joiner work		1 48													1 48
Cleveland Gas Co.	Gas			12 80												12 80
Farnan's Brass Works	Brass plugs							16 00								16 00
Thomas Feran	Teaming	36 00														36 00
W. H. Ford	Use of horse & wagon			16 00												16 00
W. Gaul	Hauling ashes		3 00		68 62											71 62
Globe Iron Works	Machine work					24 88						5 68				30 56
John J. Graves	Plumbing		2 65													2 65
A. G. Harbaugh & Co	Lard oil				31 80		31 80									63 60
R. Heym	Med. services	17 50														17 50
B. Krause	" "	36 50														36 50
Leonard & Ellis	Valvoline				293 73											293 73

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JANUARY.

BILLS RENDERED BY	FOR	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
R. T. Lyon	Cement					1 30			14 25							15 55
Lyon & French	Harness rep'rs		2 05													2 05
Tug Florence N.	Use of tug		20 00													20 00
Lake S. Foundry	Pipe	480 69														480 69
T Manning, Jr. & Co.	Blacksmithing	5 60	6 46	16				15 32								27 54
Ohio Belting & Supply Co.	Rubber valves.											6 50				6 50
A. T. Osborne	Blue print pap.			3 00												3 00
R. F. Paine	Flagging	2 50														2 50
Peoples' Gas Co.	Gas				56 20											56 20
W. Quinn.	Coal.		3 13													3 13
J. B. Savage	Printing			66 50												66 50
G. C. Scofield	Boiler comp'nd				103 88											103 88

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JANUARY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
W. A. Sheldon	Pinch bar						5 00									5 00
W. P. Southworth	Soap, &c			6 95												6 95
D. T. Slater	Teaming	2 50			1 00		2 00		94 00							99 50
Strong Cobb & Co.	Lead		8 85													8 85
" " " "	"				1 75											1 75
M. Thomas	Coal	5 25														5 25
Tod, Stambaugh & Co	"				1892 81		115 50									2,007 81
Tug Jas. Amadeus	Men to crib		10 00													10 00
Upson, Walton & Co	Ax handles, &c		4 55													4 55
A. D. Wade	Labor						62 50									62 50
Ward & Jackson	Blacksmithing		10 85													10 85
Weber & Lind	Painting															130 00

ABSTRACT OF EXPENDITURES OF C
FOR THE YEAR 1886-

JANUARY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Thos. E. Willson.	Use of diving suit.		30 00													30 00
Worswick Mfg Co.	Plumber fitt'gs		7 46						7 00							14 47
H. R. Worthington	Water meters.								1 78							1 78
John T. Watterson	Carpenter w'k.										151 69					151 69

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

FEBRUARY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Chafer & Becker.	Estimate											1000 00				1,000 00
P. Carroll	Damage	200 00														200 90
Pay rolls	Labor	81 63	282 62	1943 82	1781 41		315 00	125 00	176 35	155 00						4,860 83
G. C. Barnes, Agt.	Boiler Cover'g.											280 76				280 76
S. C. Brooks & Co.	Meter box								5 50							5 50
Brooks & Co.	Stationery			5 19												5 19
Buckeye M'ch Co.	Iron work											22 91				22 91
Chafer & Becker	Mach., lab., &c.											33 77				33 77
Clev'd Gas Lt. Co.	Gas & fire clay	6 00		10 20												16 20
A. Doll, Jr	Estimate										255 00					255 00
A. Doll, Jr	Estimate										4000 00					4,000 00
Enamel Paint Co	Paint								2 40							2 40

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

FEBRUARY.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Farnan's Brass Works	Brass Work		17 95			5 90										23 85
Freeman & Hall	Estimate												3500 00			3,500 00
Wm. Gaul	Hauling ashes				66 00											66 00
Globe Iron Works	Blacksmithing				19 12											19 12
R. Greenlagh	Lake sand		2 00													2 00
H. Harrison	Brick					18 00			6 00							24 00
H. M. Hempy & Son	Plugs	19 00														19 00
T. Ingraham	Waste				50 00											50 00
Kennedy, DeForest Parsons & Co.	Repairing hyd.		4 85													4 85
Lake S. Foundry	Pipe	247 97														247 97
Lord, Bolwer & Co.	Valves	35 35														35 35

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

FEBRUARY.

Bills Rendered By.	For.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
M. McGreal	Teaming		18 37													18 37
T. Manning, Jr. & Co.	Blacksmithing		13 25													13 25
Meriam & Morgan	Oil		4 90													4 90
A. T. Osborne &	Drafting pap'r			1 68												1 68
Peoples' Gas Co	Gas				42 30											42 30
Rhodes, Belcher & Co.	Coal			7 80												7 80
J. J. Shepard	Fire brick					19 00										19 00
W. P. Southworth	Soap, &c				2 73											2 73
L. M. Southern	Pipe laying	116 81														116 81
Strong, Cobb & Co	Sponge				4 55											4 55
Tod, Stambaugh & Co	Coal				2127 44											2,127 44

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

FEBRUARY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Tod, Stambaugh & Co	Coal				1448 04											1,448 04
Upson & Walton	Rope			3 51												3 51
Van Dorn Iron Works	Estimate									3558 08						8,558 08
Vincent, Barstow & Co	Desk			40 00												40 00
Wing & Pellett	Lime					2 00										2 00
Frank Young	Varnishing										37 50					87 50

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MARCH.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Chafer & Becker	Estimate											1626 31				1,626 31
McReynolds & Gawnes	Sewer									701 64						701 64
Pay roll	Labor, etc.	100 00	292 17	1782 36	1793 65		352 50	172 25	214 75	210 00						4,917 69
W. Bingham & Co	Packing, etc			2 00	23 95		27 50		6 63							60 08
H.P Chamberlain	Services			60 00												60 00
Brooks & Co.	Stationery			3 60												3 60
Chafer & Becker	Mach Work											36 25				36 25
Cleveland Gas Co	Gas			7 30												7 30
Clev'd Paper Co.	Envelopes			8 25												8 25
Cuy Steam Furnace Co	Iron Work					5 10										5 10

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MARCH.

Bills Rendered By	For	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
John Douglass	Pipe Cover'g					78 00	4 00									82 00
Farnan's Brass Works	Ferrules							200 88								200 88
W. H. Ford	Use of horse and wagon							86 00								86 00
Wm. Gaul	Haul'g ashes				68 75											68 75
Gibson & Price	Pig lead											144 15				144 15
E. W. Gleason	Scale Preventive						7 50									7 50
Globe Iron Works	Blacksmith'g					12 34	7 58									19 92
A. & W. Kyle	Glass, crib		4 95													4 95
S. Law	Labor		6 81													6 81
Leader Pt'g Co	Advertising	25 20														25 20
Lord, Bowler & Co	Valves	22 00														22 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MARCH.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Meriam & Morgan P. Co.	Oil.				4 66											4 86
Parkins & [illegible] worth	Waste, &c						85 28									85 28
Peoples' Gas-light Co.	Gas.				80 80											80 80
Rhodes & Bridler Co.	Coal.			7 30												7 30
Strong, Cobb & Co.	Soap.			1 45												1 49
Ted. Stambaugh & Co.	Coal.				1260 47		55 98									1,486 47
Jos. Turton	Painting.										11 00					11 00
Vincent, Barstow & Co.	Office desk &c										55 00					55 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.—Continued.

MARCH.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Ward & Jackson.	Blacksmith'g		1 60													1 60
Wendorf Uhl											50 00					50 00
Worswick Mfg Co	Plumber fittings		3 98													3 98

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

APRIL.

Bills Rendered by	For.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay Rolls	Labor, &c.	1214 40	581 47	2114 12	1741 99		815 00	170 50	345 68	210 00						6,698 14
" "	Crib repairs.		101 75													101 75
Aetna Grate Co	Grate bars.					2 42										2 42
W. Bingham & Co	Wheel b'rws	23 76					53 49		2 50							79 75
Buckeye Me'h Co	Iron Works									404 00						404 00
A Augstedt	Boiler Work					973 04										973 04
Chafer & Becker	Labor.										8 50					8 50
City of Cleveland.	Paving	100 75														100 75
" " "	"	96 24														96 24
Cleveland Gas Co	Gas			6 60												6 60
Clev'd Telephone Co	Telephone services.			32 20	16 00											48 20

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

APRIL.

Bills rendered by	For	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Farnan's Brass Works	Valves, &c.		45 54				3 04									48 58
W. H. Ford	Use of horse.							72 00								72 00
W. Gaul	Teaming				3 44											3 44
Gibson & Price	Pig lead	228 42														228 42
Globe Iron Works	Mach. work.		5 36			2 25						2 28				9 89
John J. Graves	Plumbing		4 70													4 70
A. G. Harbaugh	Lard oil				27 50											27 50
Hugh Harrison	Hard brick.								34 65							34 65
H. M. Hempy & Son	Plugs	6 20														6 20
S. C. Kane	Mason work.										1 10					1 10
A. C. Kendal	Lawn seed												12 00			12 0
Kennedy, Deforest Parsons & Co.	Repairs to hydrant		2 13													2 13

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

APRIL.

Bills Rendered by.	For.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
A. W. Kyle	Glazing		18 20													18 20
L. S. Foundry	Pipe	5243 85														5,243 85
Lord, Bowler & Co.	Valves	433 47														433 47
R. T. Lyon	Cement								14 25							14 25
T. Manning Jr. & Co.	Blacksmith'g		13 64						6 67							20 31
T. Manning Jr. & Co.	Blacksmith'g	9 96	17 00					3 51								30 56
M. McGreal	Teaming	4 63														4 63
Maclean Morgan P. Co.	Oil				4 64											4 64
A. McCormick	Estimate									97 75						97 75
Peoples' Gas Co.	Gas				23 10											23 10
Pl'n D. Pub. Co.	Water rents			10 07												10 07
Rhodes & [illegible]	Coal	10 95														10 95
F. D. [illegible]	Teaming	20 50														20 50

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

APRIL.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Henry Stiegmann	Hemp pack'g	15 95														15 95
Tug Tempest	Towing		21 50													21 50
Upson, Walton &	Coal oil, etc.	84	19 47													20 31
Van Dorn Iron Works	Estimate									1563 28						1563 28
Ward & Jackson	Blacksmith'g	5 95	1 45													7 40
Geo. Worthington	Door Spri'g			5 00												5 00
Warwick Mfg. Co	Plumb. sup.		17						14 86							15 3
Henry R. Worthington	Meters								280 58							280 58

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

APRIL.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Henry R. Worthington	Meters								216 45							216 45
R. D. Wood	Hydrants	792 00														792 00
Mc. Reynolds & Gawne	Estimate									20000 00						20000 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MAY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay roll	Labor, etc.	3065 60	603 95	1847 66	1682 08	......	307 00	215 50	236 50	309 50	......	......	306 00	......	......	8,573 79
A. Augstadt	Boiler rep'rs	......	......	......	......	332 55	......	......	......	......	......	......	......	......	......	332 55
G. C. Barnes, Agt	Pipe Cover'g	......	......	......	......	......	......	......	......	......	......	12 80	......	......	......	12 80
W. E. Beck	Iron work	......	21 95	......	......	......	......	......	......	......	......	......	......	......	......	21 95
Bell, Cartwrgt & Co	Oak plank	15 03	......	......	......	......	......	......	......	......	......	......	......	......	......	15 03
W. Bingham & Co	Hard'we, etc	7 04	10	......	......	......	......	......	1 10	23 26	......	66 49	3 55	......	......	101 60
Brooks & Co.	Stationery	......	......	37 70	......	......	......	......	......	......	......	......	......	......	......	37 70
S. C. Brooks & Co	Meter boxes,	......	25 00	......	......	......	......	......	21 25	2 75	......	......	......	......	......	49 60
T. W. Cannell	Blacksmith'g	2 20	......	......	......	......	......	......	......	......	......	......	......	......	......	2 20
Chafer & Becker.	Final est.	......	......	......	......	......	......	......	......	......	......	100 00	......	......	......	100 00
City of Cleveland,	Paving	56 00	......	......	......	......	......	......	......	......	......	......	......	......	......	56 00
Cleveland Gas Co.	Gas	......	......	5 10	......	......	......	......	......	......	......	......	......	......	......	5 10
L. Cook	Mov'g house	......	......	......	......	......	......	......	......	125 00	......	......	......	......	......	125 00
Andrew Doll, Jr.	Final est.	......	......	......	......	......	......	......	......	......	5102 70	......	......	......	......	5,102 70

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MAY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
John Douglass	Boiler cov'g				50 00											50 00
Enamel Paint Co.	Paint		3 38													3 38
Farnan's Brass Works.	Brass Work							1 50								1 50
W. H. Ford	Use of horse and wagon							82 00								82 00
Freeman & Hall.	Final est.												554 45			554 45
Wm Gaul	Teaming				56 88											56 88
Gibson & Price	Pig lead	202 60														202 60
H Harrison.	Brick.								89 37							89 37
T. Ingraham	Pipe pack'g.				65 09											65 09
A C. Kendal	Grass seed												9 00			9 00
Kennedy, Deforest Parsons & Co	Lubricator				5 00											5 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MAY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Lake S. Foundry	Pipe	6925 50														6,925 50
Lord, Bowler & Co	Valves	883 25														883 25
R. T. Lyon	Cement					24 70										24 70
T. Manning, Jr. & Co	Final paymt									808 10						808 10
T. Manning, Jr., & Co.	Final paymt									515 46						215 46
T. Manning, Jr., & Co.	Blacksmth'g	47 71	28 54						1 04	3 06						80 35
W. Metcalf	Submarine diving		700 00													700 00
Peoples' Gas Co.	Gas				21 00											21 00
The Press	Advertising			6 75												6 75
S. H. Rand	Pav'g stone											30 22				30 22

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MAY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Rice & Burnett	Office furn						12 00									12 00
Short & Foreman	Printing			31 50												31 50
D. T. Slater	Teaming	13 50														13 50
W. P. Southworth	Pails		1 25													1 25
Henry Stiegmeier	Hemp pack	32 78														32 78
A. F. & H. Strater	Pig lead	616 26														616 26
Strong, Cobb & Co	Oil, etc		4 15													4 15
John Thompson	Steam fitting					15 15										15 15
Tod, Stambaugh & Co	Coal				1327 41											1,327 41
Upson, Walton & Co.	Oil, etc		3 25													3 25
Van Dorn Iron Works	Estimate									3016 02						3,016 02

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

MAY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Ward & Jackson.	Blacksmith'g	7 40	12 97													20 37
Wing & Pellett.	Lime..					2 00										2 00
R. D. Wood & Co..	Hydrants....	792 00														792 00
Worswick Mfg Co	Pipe, etc ...		24 06	34 85												58 91
H. R. Worthington	Meters	291 68														294 68

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

JUNE.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay rolls	Labor, etc.	3501 18	499 91	2015 18	1706 69		862 00	180 50		577 14			75 60			8,947 23
W. Bingham & Co	Packing, etc.	8 73			22 12			5 00	2 78	4 84			21 57			59 16
F. & H. Born	Lant. globes	9 00														9 00
W. P. Braund	Blacksmith g	23 42														23 42
Brooks & Co	Stationery			18 40												18 40
S. C. Brooks & Co.	Metr box's &c								12 26							12 26
T. H. Brooks & Co.	Stop c. boxes									8 00						8 00
Claflen Paving Co	Paving	33 50														33 50
Clev'd Fire Dept	Old hose.	148 20														148 20

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JUNE.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Cleveland Gas Co	Gas & fire cl'y	18 00		4 80												22 80
Clev'd Telp'ne Co	Telephone services.			48 00												48 00
John Douglas	Pipe cover'g				6 00											6 00
Farnan's Brass Works	St. washers & ferrules		8 35			1 25		207 90	3 98	40 00						261 48
Chas. Fanacht	Brooms				6 50											6 50
W. H. Ford	Use of horse.		54 00					74 00								128 00
W. Gaul	Haul'g ashes				37 68											37 68
Gibson & Price	Pig lead	574 37														574 37
E. W. Gleason	Scale Preventive.				50 96											50 96
Globe Iron Works	Blacksmth'g					12 52	3 90									16 42
John J. Graves	Plumbing															0

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JUNE.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
H. M. Hempy	Plugs	23 30														23 30
Thos Hobbs	Mason work.									289 78						289 78
Leader Print. Co	Advertising			9 00												9 00
Leonard & Elles.	Valvoline				299 47											299 47
Lord, Bowler & Co	Valves, &c	925 16														925 16
R. T. Lyon.	Cement								14 25							14 25
Lake S. Foundry.	Pipe	7744 56														7,744 56
M. McGreal	Teaming	31 50														31 50
T Manning, Jr & Co	Blacksmith'g	18 65	30 36							8 12						57 13
Meriam & Morgan	Oil				4 42											4 42
P. L. Miles	Badges			9 00												9 00
J. L. Mott Iron Works	Fountain									200 90						200 90

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JUNE.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
A. T. Osborne & Co.	Paint												69 55			69 55
Peoples' Gas Co.	Gas				36 30											36 30
Rhodes & Beidler Co.	Coal	13 00														13 00
J. B. Savage	Stationery			53 00												53 00
Short & Foreman	Stationery			34 20												34 20
Strong, Cobb & Co	Soap			5 00												5 00
Tod, Stambaugh & Co.	Coal				1428 45											1,428 40
T. J. Towson & Co.	Cement		9 23													9 23
Upson, Walton & Co.	Paint		1 01													1 01

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JUNE

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Van Dorn Iron Works	Fence									2886 80						2,886 80
A Van Tassel & Co.	Hardware				61 80											61 80
Waechter am Erie	Advertising			6 66												6 66
Ward & Jackson	Blacksmith'g	14 15	2 78			12 95										29 88
Whitteer Mach Co	Water gates	840 00														840 00
Wood Bros.	Sewer pipe	9 76														9 76
R. D. Wood & Co.	Hydrants	1980 00														1,980 00
Worwick Mfg. Co	Plumber fittings		25 97			1 80	11 65		32 45							71 87
H R Worthington	Meters								409 20							409 20
Frank Young	Painting					63 00										63 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

JULY.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay rolls.	Labor, etc	2982 58	490 63	2135 91	1712 59		288 50	185 00	296 85	370 50			125 80			8,587 86
A. Adams	Horse-shoe'g.		6 00													6 00
Anzeiger Pub. Co	Advertising.			6 00												6 00
A. Augstedt.	Boiler work					8 62										8 62
W E. Beck	Joiner work		4 00													4 00
W. Bingham & Co	Hardware	2 50	2 32		8 01					19 92						32 75
S. C. Brooks & Co	Meter boxes								28 80							28 80
Chapin Nut & Bolt Works	Oil cups, etc				6 05											6 05
City of Cleveland.	Pavemnt repairs	59 50														59 50
Chas. Crabbe	Horse medic		1 00													1 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JULY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine	Crib.	Total.
Cleveland Gas Co	Gas			5 20												5 20
Farnan's Brass Works	street washers, etc							19 66		15 57						35 23
W. H. Ford	Use of horse							66 00								66 00
W. Gaul	Haul'ng ash's				57 75											57 75
Gibbs Bros.	Two horses							170 00								170 00
Gibbs Bros	B'd of horse							24 00								24 00
Gibson & Price	Pig lead	698 79														698 79
Glidden & Drake, Agents.	Coal				44 01											44 01
Globe Iron Works	Engine work					265 82										265 82
Hugh Harrison	Brick								56 70							56 70
H. M. Hempy & Son	Plugs	22 80														22 80

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JULY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Kelley Is. Lime Co	Lime					1 00										1 00
Kennedy, DeForest, P. & Co.	Hyd. repairs		4 36													4 36
Leader Pt'g Co	Advertising				23 10											23 10
W O LePelley	Joiner work					28 88										28 88
Lord, Bowler & Co.	Valves	789 27														789 27
Lake S. Foundry	Pipe	6245 28														6,245 28
R. T. Lyon	Cement					9 50	4 75		14 25							28 50
T. Manning, Jr., & Co.	Blacksmth'g	23 21	15 24					18 68								57 13
A. T. Osborne & Co.	Paint									1 25						1 25
L. W. Osler, M.D.	Med Services	10 00														10 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JULY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Peoples' Gas Co.	Gas				48 10											48 10
Wm Quinn	Coal		2 50													2 50
Rauch & Lang	Wagon rep'r		87 10													87 10
Rhodes & Beidler.	Coal	4 00														4 00
J. B. Savage	Printing			70 00												70 00
J. J. Shepard.	Fire brick				54 70											54 70
D. T Slater	Teaming	70 50														70 50
W. P. Southworth	Pails		1 50													1 50
Henry Stiegmaier	Twine	5 02														5 02
Strong, Cobb & Co	Oil		2 25													2 25
" " "	Paint & oils		1 70													1 70
Sturtevnt Lum. Co	Fencing												339 61			339 64
Tod, Stambaugh & Co.	Coal				1510 68											1510 68

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

JULY.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Upson, Walton & Co.	Paint & oils,	....	79 17	....	....	....	....	....	....	....	....	....	....	....	....	79 17
Wood Bros.	Repairs to pavement.	123 15	....	....	....	....	....	....	....	....	....	....	....	....	....	123 15
R. D. Wood & Co.	Hydrant	378 00	....	....	....	....	....	....	....	....	....	....	....	....	....	378 00
Worswick Mfg Co	Plumb goods	....	17 57	....	....	....	....	....	9 86	35 88	....	....	....	....	....	64 31
H. R. Worthington	Meters	....	....	....	....	....	....	....	963 04	....	....	....	....	....	....	763 04

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

AUGUST.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay roll ...	Labor.	3572 55	522 76	2066 86	1860 80	....	362 00	180 50	882 70	510 71	....	....	73 00	...	....	9531 58
Aetna Grate Co	Grate bars..	....	....	....	3 95	...	....	....	....	....	....	....	....	....	....	3 95
N. H. Ambler..	Gravel	....	....	....	....	....	....	....	....	20 00	....	....	....	....	....	20 00
Bell,Cartwrgt&Co	Timber	6 66	....	....	....	....	....	....	....	....	....	....	....	....	....	6 66
W. Bingham & Co	Hard'we etc.	1 00	3 22	....	62 23	....	....	....	....	....	....	....	....	....	....	66 45
F. & H. Born	Rep'r pump	....	8 52	....	....	....	....	....	....	....	....	....	....	....	....	8 52
W. P. Braund	Blacksmth'g	14 92	....	....	....	....	....	....	....	....	....	....	....	....	....	14 92
S. C. Brooks & Co	Meter boxes.	....	....	....	....	....	....	....	13 85	....	....	....	....	....	....	13 85
Brooks & Co	Stationery	....	....	26 09	....	....	....	....	....	....	....	....	....	....	....	26 09
City of Cleveland.	Paving	89 26	....	....	....	....	....	....	....	....	....	....	....	....	....	89 26
Claflin Paving Co	Paving	2 10	....	....	....	....	....	....	....	....	....	....	....	....	....	2 10
Cleveland Gas Co	Gas	....	....	4 30	....	....	....	....	....	....	....	....	....	....	....	4 30

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

AUGUST.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Edwards, Townsend & Co	Soap				4 00											4 00
Farnan's Brass Works	Ferules and No.							189 83								189 83
W. H. Ford	Use of horse and wagon		6 00													6 00
Gibbs Bros.	Board, horse							46 25								46 25
Gibson & Price	Pig lead	700 17														700 17
E. W. Gleason	Scale preven				24 15											24 15
Goff, Kirby Coal Co	Coal				41 79											41 79
H. Harrison	Brick								98 30							98 30
H. M. Hempy & Son	Plugs	18 55														18 55
Thos. Hobbs	Plaster, ho'se						29 50									29 50
E. H. Jones & Co.	Freight								28 03							28 03

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

AUGUST.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Kennedy, DeForest, P. & Co	Repairing		18 82													18 82
Lake S. Foundry	Pipe	12706 01														12,706 01
Lord, Bowler & Co	Valves	1210 85														1,210 85
R. T. Lyon	Cement								14 25							14 25
Lyon & French	Harness fit'g							30 55								30 55
M. McGreal	Haul'g pipe	12 25						51								12 76
T. Manning, Jr., & Co.	Blacksmth'g	27 86	5 17						80	5 57						39 40
A. T. Osborne & Co.	Draft'g pap.			12 90												12 90
Peoples' Gas Co	Gas				43 70											43 70
Rhodes & Beidler Coal Co.	Coal	15 00														15 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

AUGUST.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Rice & Burnett	Brushes			2 50												2 50
H. Sackman	Two keys			1 15												1 15
Sanford & Co.	Coal				8 12											8 12
J. J. Shepard	Tile				2 95											2 95
L. P. & J. A. Smith	Use of Tug		24 00													24 00
W. P. Southworth	Soap			5 68												5 68
A. F. Strater	Pig lead	497 56														497 56
Strong, Cobb & Co	Oil		2 10													2 10
Tod, Stambaugh & Co.	Coal				1562 04											1,562 04
Union Oil Co.	Lard oil				27 30											27 30
Upson, Walton & Co.	Rope, etc		12 62													12 62

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

AUGUST.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Viaduct Boiler Works	Riveting					25 80										25 80
Ward & Jackson	Blacksmith'g	5 53	20 89													26 42
R. D. Wood & Co.	Hydrants	1134 00														2182 00
Wood Bros.	Pipe sewer	5 80														5 80
Worwick Mfg. Co.	Plumb. fit'gs								8 43							8 43
H. R. Worthington	Water meter								1733 46							1733 46
Jno. J. Graves	Plumbing	208 68														208 68
F. A. Kemsley	Services			80 00												80 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

SEPTEMBER.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay rolls	Labor	3817 33	648 33	2272 36	1719 91		362 00	189 50	448 02	155 00			75 50			9,688 95
A. Adams	Horse shoe'g		5 50					10.00								15 50
Aetna Grate Co.	Grates					2 00										2 00
W. Bingham & Co	Packing, etc.	9 44	1 60	95	10 65		8 58		5 28							36 50
Brooks & Co.	Stationery			1 50												1 50
F. & H. Born	Repairing pumps		75													75
City of Cleveland	Repairing pavements	21 36														21 36
Clev'd Gas Lt, Co.	Gas, &c			4 60												4 60
Clev'd T'lph'ne Co	Tel. Service			30 50	17 50											48 00
Chas. Crabbe	Vet. Surgeon							7 00								7 00
Fairbanks, Morse & Co.	Rep. Scale	9 00														9 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

SEPTEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Farnan's Brass Works	Valv plate&c					13 80		1 00								14 80
John Flinn	Renovating mattrass			8 00												8 00
W. H. Ford	Use of horse & wagon							10 00								10 00
Freeman & Hall	Final paym't												144 87			144 87
Gibbs Bros	B'd. horses							41 91								41 91
Gibson & Price	Pig lead	395 99														395 99
Hugh Harrison	Brick								94 07							94 00
H M. Hemp) & Son	Plugs	9 60														9 60
Hudson & Wood	Pnt'g house on Fairm't									98 30						98 50
T. Ingraham	M'che waste				46 31											46 31

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

SEPTEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
A. C. Kendal	Grass seed												18 50			18 50
Lake S. Foundry	Pipe	10930 27														10,930 27
Lord, Bowler & Co	Valves, etc.	773 92														773 92
C. B. Lyon	Carpenter work, &c.									95 76						95 76
R. T. Lyon	Cement								28 50							28 50
Mary McAuly	Wash towels			7 17												7 17
J. McGreal	Teams	7 00														7 00
T. Manning Jr. & Co	Blacksmth'g	31 40	10 56	4 03				15 00	5 28							51 42
Meriam & Morgan	Carbon oil				4 50											4 50
A. T. Osborne & Co	Trac'g linen			8 75												8 75
W. H. H. Peck	Rub'r wash'r		2 44													2 44
Peoples' Gas Co.	Gas				43 80											43 80
S. H. Rand	Paving stone												25 00			25 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

SEPTEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Rhodes, & Beidler Coal Co.	Coal.	6 00														6 00
J. J. Shepard	Tile.									96 00						96 00
Strong, Cobb & Co	Duster			1 99												1 99
D. T. Slater	Teaming	36 00														36 00
Sturtevant Lum. Co	Lumber												6 84			6 84
Tod, Stambaugh & Co	Coal,				1179 87											1179 87
Upson, Walton & Co.	Rope, etc		6 04													6 04
A. T. Van Tassel Co.	Hardware				89 47											89 47
Ward & Jackson	Blacksmith'g	17 06														17 06

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

SEPTEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
The West Newton Mines	Coal				946 07											946 07
Wood Bros	Build, culv't									100 00						100 00
R. D. Wood & Co.	Hydrants	1512 00														1512 00
Worswick Mfg Co.	Plum'r goods								47 99							47 99
H. R. Worthingt'n	Water metrs								703 09							706 09

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

OCTOBER.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay rolls	Labor, etc...	5639 21	462 01	2274 01	1750 22	....	426 95	185 00	485 48	155 00	.....	....	68 10	...	......	11445 98
W Bingham & Co.	Hardware	23 83	.....	.....	24 66	.....	6 16	....	1 29	.... ..	......	.....	.....	.....	.....	55 94
F & H. Born	Sucker rod	.....	1 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 25
W. P. Braund	Blacksmith'g	18 70	....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18 70
Brooks & Co	Blank books	.....	.....	2 80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 80
S. C. Brooks & Co	Meter boxes	11 23	.....	.....	.....	.....	.....	.....	10 35	.....	.....	.....	.....	.....	....	21 58
City of Cleveland.	Pavemnt repairs	27 60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27 60
Cleveland Gas Co	Gas	.....	.....	7 80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 80
Clev'd Telp'ne Co	Telephone services.	.....	.....	5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	5 00

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

OCTOBER.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Cuy. Steam Furn. Co	Valve cover					18 16										18 16
Farnan's Brass Works	Ferrules							106 68								106 68
Fanacht Bros.	Brooms				6 50											6 50
Gibson & Price	Pig lead	2222 37														2,222 37
Globe Iron Works	Blacksmth'g					172 38										172 37
John J. Graves	Plumbing	230 54														230 54
John J. Graves	Plumbing	30 07														30.07
John J. Graves	Plumbing	138 53														138 53
H. M. Hempy	Plugs	24 90														24 90
Hugh Harrison	Brick								81 87							81 87
Lord, Bowler & Co	Valves	830 61														830 61
Lake S. Foundry	Pipe	12779 90														12,779 90

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

OCTOBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
R. T. Lyon.	Cement				28 50				28 50							57 00
T. Manning, Jr. & Co.	Blacksmith'g	41 12	7 41						1 29							49 85
Jas. McAdams	Street sprink			109 00												109 00
McReynolds & Gawne	Sewer									701 00						701 00
W. Metcalf	Diving		432 00													432 00
Ohio Belting Supply Co.	Valves				21 60											21 60
Peoples' Gas Co	Gas				49 70											49 70
Pomerene Dam	Stenogr'ph'r			10 00												10 00
Rhodes & Beidler Co.	Coal	18 00														18 00
J B Savage	Blank books			27 50												27 50

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

OCTOBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
G. C. Scofield	Boiler comp				38 25											38 25
W. P. Southworth	Pails		1 50													1 50
Standard Derrick Co.	Iron bucket		6 30													6 30
A. F. & H Strater	Pig lead	78 28														78 28
Strong, Cobb & Co	Lard oil		2 75													2 75
Upson, Walton & Co	Oil		5 46													5 46
Ward & Jackson	Blacksmth'g	33 70														33 70
The West Newton Mines	Coal				879 55											879 55
Wood Bros.	Pipe		60													60
Worswick Mfg Co	Plum'rgoods						3 35		46 76							50 11

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

OCTOBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Henry R. Worthington	Meters								917 18							917 18
R. D. Wood & Co.	Hydrants	1184 09														1184 09
Viaduct Boiler Works	Boiler rep'rs					251 81										251 81

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

NOVEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay rolls.	Labor.	4839 15	373 13	2254 91	1771 29		384 20	185 00	416 32	166 77						10,390 77
Anzeiger Pub. Co	Advertising			6 00												6 00
A. Augstedt.	Boiler work					502 63										502 63
W. E. Beck	Chimney top		15 00													15 00
W. Bingham & Co	Packing, etc.	25 26	2 49				3 75		2 41							33 91
F. & H. Born	Burner	2 20														2 20
Brooks & Co.	Ink stand			1 85												1 85
C. Burnside	Tan bark			13 70												13 70
Clev'd Gas Lt. Co.	Fire clay	6 00		11 90												17 90
Clev'd Paper Co.	Stationery			3 80												3 80
John Douglas	Mason work.					6 90										6 90
City of Cleveland	Pavm't rep's	289 62														289 62

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

NOVEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Eclipse Iron W'ks	Manhole and cover								33 00							33 00
T. Ellwood & Son.	Livery			16 00												16 00
W. H. Ford	Use of horse and wagon							4 00								4 00
Farnan's Brass Works.	Ferrules.							29 20								29 20
Gibbs Bros.	Board. horse							54 93								54 93
" "	Board. horse							54 25								54 25
A. W. Kyle	Glass and Glazing.			2 40												2 40
Lake S. Foundry.	Pipe.	8104 36														8104 36
Gibson & Price	Pig lead	930 48														930 48
H. Harrison.	Brick.							44 70								44 70

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

NOVEMBER.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
S. Law	Joiner work		10 00													10 00
Leader Print. Co.	Printing			12 50										150 25		162 75
Leonard & Elles	Valvoline				292 57											292 57
Lord, Bowler &Co	Valves	990 28														990 28
R. T. Lyon	Cement								28 50							28 50
W. A. Madison Sec	Trav. expn's													357 50		357 50
Thos. Manning Jr. & Co	Blacksmth'g	43 99	11 70						1 20							56 89
A. T Osborne	Draft. paper			7 40												7 40
W. H. H. Peck	Rub'r goods.							15 50								15 50
Peoples' Gas Co.	Gas				60 10											60 10
Plain Dealer Pub. Co.	Notice adv			10 07												10 07
Strong, Cobb & Co	Oil		4 85													4 85

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

NOVEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
R. D. Throupe	Med. attend								5 00							5 00
The Press	Advertising.			7 50												7 50
Rauch & Lang	Wagon rep'r		18 65													18 65
TugTomMaythem	Towing			8 00												8 00
J. Thomas	Cylinder oil				34 80											34 80
D. T. Slater	Cartage	77 75														77 75
Union Oil Co.	Oil.				28 89											28 89
Upson, Walton & Co.	Capstan bars	1 05														1 05
Ward & Jackson	Blacksmith'g	10 57														10 57
The West Newton Mines	Coal.				1232 56		118 11									1,350 67
Wood Bros.	Pipe		1 36													1 36

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886.

NOVEMBER.

BILLS RENDERED BY.	FOR.	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
R. D. Wood & Co.	Hydrants. ..	756 00	....	.. ...	....	....	....	....	... ...	....	... .	....	....	....	....	756 00
Worswick Mfg Co	Plumb. sup.	.. ....	26 56	.. ...	.. ....	16 50	.... .	....	51 98	....	....	....	..... .			95 04
H R. Worthington	Meters	.....	....	. .....	....	..... .	..... .	......	1607 93	....	....	....	....	....	......	1,607 93

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

DECEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Pay roll	Labor, etc	687 37	458 21	2208 86	1660 27		858 00	165 00								6038 01
Aetna Grate Co	Grate bars					1 96										1 96
A. Adams	Horse shoe'g		13 50													13 50
W. Bingham & Co	Hardw'e, etc.		11 53		13 55		1 80									26 88
W. P. Braund	Blacksmith'g	10 00														10 00
Catherine Barrett	Judgment	500 00														500 00
City of Cleveland	Paving	96 44														96 44
Clark Britton Ptg Co.	An. Reports			808 28												808 28
Columbia Inj. Co.	Injector, &c.														18 84	18 84
Chas. Crabbe	Veterinary services															5 00
Dakin Bros.	Plumbing		2 26				5 00									2 26

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

DECEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
Thos. Elwood&Co	Use of horse and wagon			43 00												43 00
Farnan's Brass Works	Rep'r'g valv,		5 75													5 75
W. H. Ford	Livery		19 00													19 00
For. City Ice Co	Ice			11 79												11 79
W. Gaul	Haul ash. &c				160 88											160 88
Gibbs Bros	Board'g hors							29 50								29 50
Gibson & Price	Lead	50 00														50 00
H. M. Hempy	Plugs	11 08														11 08
Kennedy, DeForest, P. & Co	Hydra't pipe		11 78													11 78
Lake S. Foundry	Pipe															388 84
Lord, Bowler & Co	Valves															60 76

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

DECEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
R. T Lyon.	Cement.. ..								14 85							14 85
Lyon & French..	Horse blanket, etc.....		5 00					9 80								14 80
T Manning, Jr. & Co ..	Blacksmith'g	11 40	9 00					1 28								21 68
Meriam & Morgan P. Co .	Oil.				4 21		4 31									8 55
J. W. Nixon	Plumbing	24 08														24 08
W H. H. Peck ..	Steam Hose, etc														42 98	42 98
Peoples' Gas Co	Gas				62 70											62 70
Purdy & McNeil	Lumber	73 07	91 24			9 96			35 77							210 04
Rhodes, & Beidler Coal Co..	Coal	15 10														15 10

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR [illegible].

DECEMBER.

[illegible]	For	Pipe Extension.	General Repairs.	Office and General Expenses.	Engine House Expenses.	Engine House Repairs.	High Service.	[illegible]	Meters.	[illegible] Reservoir.	High Service [illegible]	High Service [illegible]	Kinsman Reservoir.	New Engine.	Crib.	Total.
J. B. Savage	Books			[illegible]												[illegible]
[illegible]	Printing								[illegible]							[illegible]
[illegible]	Boiler compound				[illegible]											[illegible]
[illegible] Smith	Printing			[illegible]												[illegible]
[illegible] & Co.	Oil		1 00													1 00
[illegible]	[illegible]			[illegible]												[illegible]
[illegible] & Co.	Coal				[illegible]											[illegible]
John Thompson	Iron work					11 [illegible]										11 [illegible]
Variety Iron W'ks	Boiler.														[illegible]	[illegible]
Ward & Jackson	Blacksmith'g	[illegible]											18 [illegible]			[illegible]
The West Newton Mines	Coal.				[illegible]		[illegible]									[illegible]

ABSTRACT OF EXPENDITURES OF CLEVELAND WATER WORKS FOR THE YEAR 1886—Continued.

DECEMBER.

BILLS RENDERED BY	FOR.	Pipe Extension.	General Repairs.	Office and Gen'l Expen's	Engine House Expenses.	Engine House Repairs.	High Service.	Ferrules.	Meters.	Fairmount Reservoir.	High Service Eng. House.	High Service Engine.	Kinsman Reservoir.	New Engine.	Crib.	Total.
H. R. Worthingt'n	Meters								584 98							584 98
Worswick Mfg Co	Plumb goods								16 45						47 28	63 73
Total		129600 69	8194 67	36482 57	48179 21	3014 85	5054 98	3810 85	12016 81	37340 36	11810 68	2113 69	15466 94	507 75	213 95	286,807 33

Schedule Showing the Gallons of Water Pumped and Coal Consumed in Pumping, Percentage of Coal consumed, and Water Pumped by Each Engine, Contract Price of Coal and Cost of Coal for Raising 1,000,000 Gallons into Reservoir.

Engine.	No.	Water Pumped by the Different Engines.	Pounds of Coal Consumed by the Different Engines.	Per cent. of Water Pumped by the Different Engines.	Per cent. of Coal Consumed by the Different Engines.	Per cent. of Coal Consumed by the Different Engines, Pumping 1,000,000 Gallons into Reservoir.	Contract Price of Coal.	Cost of Coal for Pumping 1,000,000 Gallons into Reservoir.	Year.
Worthington	1	1,478,690,280	4,844,900	20 67	21.55	23 51	$ 1 50	$ 2 46	1896
Worthington	2	2,647,954,420	8,119,150	37.14	36.18	21 98	1 50	2 30	1896
Worthington	3	2,957,227,080	9,197,000	41.21	40.92	22 40	1 50	2 33	1896
Henderson	1	69,863,625	314,120	00.98	1.40	32.16	1 50	3 37	1896

WORTHINGTON DUPLEX ENGINE No. 1. RECORD FOR 1886.

Months.	Pumping.				Coal Consumed.			Gal. of Water Pumped.	Height in Ft. and Dec.	Duty.
	Days.	Hours.	Min.	Strokes.	Raising Steam.	Pumping.	Total.			
Jan	31	716	20	369,783	3,000	710,450	713,450	229,265,460	184.0	[illegible]
Feb	28	672	..	318,360	2,000	780,400	782,400	215,983,200	184.0	42,487,94[illegible]
March.. ..	[illegible]	474	..	212,913	2,000	367,000	[illegible]	131,009,8[illegible]0	[illegible]	[illegible]
April.....	30	712	40	379,943	2,000	[illegible]	711,000	235,566,5[illegible]0	184.0	[illegible]
May.. ..	15	339	..	219,518	......	216,950	216,950	126,101,[illegible]60	184.0	[illegible]
June	7	92	50	49,328	60,000	94,600	154,600	20,583,360	182.32	[illegible]
July.. ...	15	222	25	135,911	20,000	280,000	300,000	84,881,820	[illegible]	[illegible]
August. ..	21	249	10	118,427	35,000	265,000	[illegible]01,000	92,024,740	184.73	[illegible]
Sept.....	14	155	15	87,534	28,000	209,700	237,700	54,258,000	185.13	35,105,[illegible]
Oct ..	19	444	15	257,705	2,000	527,100	529,100	165,977,100	183.50	[illegible]
Dec	20	153	..	153,428	56,000	313,000	[illegible]	96,98[illegible]	191.61	[illegible]
Total and averages	[illegible]	[illegible]	35	2,375,823	211,000	[illegible]	4,844,200	1,473,630,260	185.23	[illegible]

WORTHINGTON DUPLEX ENGINE No. 2. RECORD FOR 1886.

[illegible]

WORTHINGTON DUPLEX ENGINE No. 2 RECORD FOR 1886

Months.	Pumping.				Coal Consumed			Gallons of Water Pumped	Height in Feet and Dec.		Duty
	Days.	Hours	Minutes	Strokes	Raising Steam	Pumping	Total.				
January.	31	721	20	374,080	2,000	716,500	718,500	271,[illegible]5,800	184		47,089,283
February.	27	624		324,230	1,000	683,000	684,000	207,025,000	184		45,174,255
March.	2[illegible]	744		375,720	1,000	628,400	629,400	2[illegible]0,203,980	184		53,872,089
April	18	407		233,044	1,000	448,500	449,500	144,187,280	184		49,705,127
May..	31	730	[illegible]	473,[illegible]90		880,070	880,070	293,707,[illegible]	178	52	49,807,671
June	30	720		469,677		817,800	817,800	287,618,700	177	11	51,742,978
July.	31	7[illegible]	[illegible]	464,512	1,500	897,300	898,800	287,[illegible]97,4[illegible]0	182	35	48,896,570
August.	31	744		446,[illegible]		898,700	898,700	276,924,800	181	27	[illegible]0,609,174
September	30	719		444,250		903,800	903,800	275,128,[illegible]	183	16	46,363,965
October	23	537	[illegible]	318,440		533,200	533,200	197,132,5[illegible]0	183	01	50,[illegible]7,770
November..	30	71[illegible]	10	395,231	3,000	902,000	905,000	245,043,[illegible]0	182	53	41,[illegible]0,303
December	31	72[illegible]	30	447,014		914,100	914,100	277,520,[illegible]0	187	51	47,616,576
Totals and averages	344	8,[illegible]		[illegible]	9,500	9,187,900	9,197,[illegible]	2,937,[illegible]	182	65	48,7[illegible],844

HENDERSON DUPLEX ENGINE RECORD FOR 1886.

Months.	Pumping.				Coal Consumed.			Gallons of Water Pumped.	Height in Feet and Dec.		Duty.
	Days.	Hours	Minutes	Strokes.	Raising Steam	Pumping	Total				
January.	2	27	15	13,141	3,000	36,200	39,200	7,345,810	184		28,6[illegible]
June ..	1	2	..	9[illegible]0	1,000	2,700	3,700	519,870	180		22,[illegible]
July.	7	138	5	87,178	4,000	220,700	224,700	49,8[illegible]5,8[illegible]	181	4[illegible]	[illegible]
December.	2	39		21,210	4,000	42,400	46,400	12,[illegible]	[illegible]		[illegible]
Total and averages.	12	206	20	122,4[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

SCHEDULE SHOWING THE DISTRIBUTION OF WATER FOR EACH DAY AND MONTH IN THE YEAR 1886.

Months.	Gallons of Water Pumped by Henderson Engine.	Gallons of Water Pump'd by Worthington Engine No. 1.	Gallons of Water Pumped by Worthington Engine No. 2.	Gallons of Water Pumped by Worthington Engine No. 3.	Gallons Distributed.			
					Per Month.	Average Per Day.	Each Inhabitant Per Day.	Each Consumer Per Day.
January.	7,345,819	229,265,460	166,794,200	231,865,800	635,271,279	20,492,621	95.76	143.84
Feb'y....	... .	215,963,200	209,216,820	201,082,600	626,262,620	22,366,522	104.51	156.66
March...	....	131,999,860	220,667,300	220,303,980	572,971,140	18,482,940	86.37	129.46
April ...	. . ..	235,566,580	98,533,200	144,487,220	473,587,000	15,786,233	73.76	110.57
May.....	....	136,101,160	158,002,980	293,507,380	587,611,520	18,798,920	87.82	131.64
June. ...	519,870	30,583,360	280,858,180	285,618,500	597,574,910	19,919,163	93.08	139.52
July.....	49,865,816	84,881,820	290,105,440	287,997,440	712,853,516	22,995,274	107.45	161.07
August..	....	92,024,740	268,883,240	276,924,860	637,782,840	20,573,640	96.18	144.10
Sept. ...	....	54,258,680	274,552,120	275,428,800	604,239,600	20,141,320	94.11	141.08
October.	....	165,977,100	183,338,960	197,436,520	546,752,580	17,637,180	82.41	123.54
Nov......	....	.. ..	246,729,620	245,043,220	491,772,840	16,392,428	76.60	114.82
Dec... ..	12,132,120	96,985,360	260,355,360	277,520,680	646,993,520	20,870,758	97.53	146.12
Total and averages	69,863,625	1,473,630,260	2,647,952,420	2,937,227,060	7,128,673,365	19,530,611	91.26	136.80

The water pumped by the Cornish engines should be deducted from that shown in the above table to find the quantity distributed in the Low Service District.

SCHEDULE SHOWING THE TOTAL AND AVERAGE QUANTITIES OF WATER PUMPED EACH YEAR SINCE THE BEGINNING OF THE WORKS.

Years	Gallons Distributed.				Per cent. of Increase.
	Per Year.	Per Day.	Each Inhabitant Per Day.	Each Consumer Per Day.	
1857	127,262,265	348,664	7.73	110.98	
1858	142,155,434	389,467	8.37	93.44	11.70
1859	198,234,030	543,107	11.31	91.27	39.45
1860	260,220,354	710,984	14.11	105.57	31.27
1861	322,175,022	882,599	16.32	114.50	23.81
1862	369,673,092	1,012,794	19.47	120.57	14.74
1863	420,790,975	1,152,875	20.07	117.54	13.83
1864	476,114,225	1,300,858	21.68	123.80	13.14
1865	517,261,005	1,417,153	21.80	122.70	8.64
1866	587,372,220	1,609,239	22.35	124.36	13.55
1867	696,369,375	1,907,861	23.85	115.98	18.55
1868	768,786,975	2,100,505	24.77	116.08	10.40
1869	898,931,425	2,462,829	27.36	120.20	16.92
1870	1,126,228,500	3,085,558	30.83	113.20	25.28
1871	1,367,621,100	3,746,907	35.68	124.90	21.43
1872	1,686,270,895	4,607,371	40.07	131.64	23.27
1873	1,869,768,835	5,095,290	43.06	137.71	10.88
1874	2,050,252,910	5,625,150	45.86	141.10	9.65
1875	2,216,775,816	6,073,358	44.00	136.65	8.12
1876	2,399,225,403	6,573,220	49.23	131.28	8.23
1877	2,820,329,674	7,726,930	55.91	142.24	17.55
1878	2,892,946,823	7,925,882	51.13	135.06	2.57
1879	3,455,271,081	9,466,496	62.49	145.61	19.43
1880	3,725,683,021	10,179,461	65.23	145.23	7.82
1881	4,847,209,361	13,280,025	76.76	162.34	30.10
1882	4,494,538,536	12,313,804	68.41	126.04	7.27
1883	5,187,432,637	14,212,144	73.00	136.80	15.41
1884	5,990,378,137	16,367,153	82.66	137.83	15.47
1885	6,552,001,190	17,950,694	93.49	139.28	9.37
1886	7,128,673,365	19,530,611	91.36	136.80	8.8

HIGH SERVICE CORNISH ENGINE RECORD FOR 1886.

EAST ENGINE.

Months.	Days.	Pumping.			Coal Consumed.			Gallons of Water Pumped.	Height in Ft. and Dec.	Duty.
		Hours.	Mins.	Strokes.	Raising Steam.	Pumping.	Total.			
January....	2	8	..	2,950	....	....	2,480	946,950	143.833	
February...	4	10	30	5,325	......	......	4,480	1,709,325	144.333	
March.. ...	4	8	...	3,550	....	....	2,970	1,139,550	144.023	
July.. ....,	27	113	10	108,425	42,300	127,800	170,100	34,804,425	146.703	
September..	18	158	...	90,600	33,300	91,800	128,100	29,082,600	149.884	
December..	8	60	30	35,750	49,600	36,300	85,900	11,475,750	138.645	
Total and averages....	63	357	70	246,600	125,200	258,900	394,030	79,158,600	144.572	35,599,592

WEST ENGINE.

Months.	Days.	Hours.	Mins.	Strokes.	Raising Steam.	Pumping.	Total.	Gallons of Water Pumped.	Height in Ft. and Dec.	Duty.
January ...	13	52	55	22,325	.....	....	18,600	7,166,325	147.904	
February...	5	10	30	5,050	......	......	4,450	1,621,050	144.316	
March......	5	12	...	5,350	....	....	4,500	1,717,370	144.166	
April.. ...	3	1	35	550	......	......	465	176,550	144.283	
May.......	22	79	54	33,950	....	.....	18,986	10,897,950	141.761	
June..	13	93	10	12,175	20,000	40,250	60,250	13,538,175	153.608	
August. ...	29	254	5	140,700	46,400	151,500	197,900	45,036,300	154.916	
October....	20	146	30	74,870	34,500	87,300	121,800	24,010,800	150.350	
November..	22	143	75	75,800	39,200	85,600	124,800	24,652,800	155.894	
Total and averages...	132	790	231	401,300	140,100	364,650	551,751	128,817,300	148.588	38,884,547

BOTH ENGINES.

Months.	Days.	Hours.	Mins.	Strokes.	Raising Steam.	Pumping.	Total.	Gallons of Water Pumped.	Height in Ft. and Dec.	Duty.
East.. ...	63	357	70	246,600	125,200	258,900	394,030	79,158,600	144.572	
West	132	790	231	401,300	140,100	364,670	551,751	128,817,300	148.588	
Total and averages...	195	1147	301	647,900	265,300	623,570	945,781	207,975,900	146.580	

SCHEDULE SHOWING THE DISTRIBUTION OF WATER FOR EACH DAY AND MONTH IN THE YEAR 1886 IN HIGH SERVICE DISTRICT.

Months.	Gallons of Water Pumped by E. Cornish Engine.	Gallons of Water Pumped by W. Cornish Engine.	Gallons Pumped. Per Month.	Gallons Pumped. Average Per Day.
January	[illegible]	[illegible]	[illegible]	[illegible]
February	[illegible]	[illegible]	[illegible]	[illegible]
March	[illegible]	1,717,350	[illegible]	[illegible]
April		[illegible]	[illegible]	[illegible]
May		[illegible]	10,897,950	[illegible]
June		[illegible]	13,538,177	451,272
July	34,804,425		34,804,425	1,122,723
August		[illegible]	45,066,300	1,452,783
September	[illegible]		29,082,000	[illegible]
October		[illegible]	[illegible]	[illegible]
November		[illegible]	[illegible]	[illegible]
December	11,477,550		[illegible]	[illegible]
Total and averages	[illegible]	[illegible]	[illegible]	[illegible]

BU. [illegible] 1913